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The Missing Partner

BY BERTON BRALEY

Written expressly for Coal Age.

I

There ain't no FUN in my work
no more,
I'm lonesome an' sad all day,
'Tain't like it was in the days before
My partner went away;
We didn't talk so awful much
But I knew that he was near,
An' Jim knew I was right in touch
An' workin' beside him here.

II

There's somethin' in workin' beside
a friend
That helps a feller on,
But now them days has reached an end
An' good old Jim is gone,
An' though I drills in the same old coal
An' blasts in the same old room,
My job, someway, has lost its SOUL
An' my heart is full of gloom.

III

We used to set an' gas at lunch
An' talk of life—an' men,
Or josh an' laugh with the whole
big bunch,
Till time to work again,
We'd share our smokin' an' chewin' too
An' trade our cake an' pie,
For we was partners, tried an' true,
That rough old Jim an' I.

IV

I was an Uncle to all Jim's boys
An' he was the same with mine,
We shared our woes an' we shared
our joys
In stormy weather or shine,
An' now them friendly days has flown
An' my heart is a lump like lead,
An' it's like I'm left in the world alone
Since my partner Jim is dead!

What Shall We Use for Roof Support?

By A. W. HESSE*

SYNOPSIS—A comparison of the advantages and disadvantages of oak, pine, chestnut, T-rails and I-beams. A table showing safe loads on beams of these different materials is also shown.

The problem of properly and economically supporting the roof is rapidly becoming one of the paramount factors of profitable mining.

Until recent years wood was used exclusively, both in the form of props and cross timbers for roof support. However, cheap as it was, many places were sparsely timbered, resulting in added expense later, both in cleaning up in order to retimber and recover that which should

The first observation made was that the use of props entirely without defect was an almost impossible practice. In one mine in particular many posts in the newer work were found broken, due to knots, splits, bruises or other defects.

Moisture adhering to the roof of the mine appeared to affect the props considerably. This dampness soaks into the top of the post where the strain is greatest on the wood fiber. As soon as the tissues at this end weaken, a greater opening is made for the entrance of disease, and decay begins. This was evidenced by the fungus growth at the top before the lower end of the prop had begun to show signs of decay. The remedy to some extent is the

TABLE COMPARING STRENGTH OF STEEL AND WOOD FOR SUPPORTING MINE ROOFS

Steel, Wt. per Yd.		Ten Ft.		Wood		Span		Steel, Wt. per Yd.		Twelve Ft.		Wood	
Uniform Load in Lb.	Re-quired Std. T. Rail	Stand. I Beam	White Oak Sawed	White Oak Round	Chestnut Sawed	Chestnut Round	White Pine Sawed	White Pine Round	Uniform Load in Lb.	Re-quired Std. T. Rail	Stand. I Beam	White Oak Sawed	White Oak Round
1,015	16	3" 16.5 lb.	5x3	5	6x4	5	6x4	5	845	16	3" 16.5 lb.	5x3	5
1,385	20	3" 16.5 "	5x4	5½	6x5	6½	6x5	6½	1,155	20	3" 16.5 "	5x5	5½
1,920	25	3" 19.5 "	6x4	6½	7x5	7½	7x5	7½	1,600	25	4" 22.5 "	6x4	6½
2,450	30	4" 22.5 "	6x5	7½	7x7	8	7x7	8	2,045	30	4" 22.5 "	6x5	7
3,090	35	4" 22.5 "	7x5	7½	8x7	8½	8x7	8½	2,580	35	5" 29.3 "	7x5	7½
3,840	40	5" 29.3 "	7x6	8	8x8	9	8x8	9	3,200	40	5" 29.3 "	7x6	8
4,475	45	5" 29.3 "	7x7	8½	10x6	9½	10x6	9½	3,735	45	6" 36.8 "	7x7	8½
5,225	50	5" 36.8 "	8x6	9	10x7	10	10x7	10	4,355	50	6" 36.8 "	8x6	9
6,290	55	6" 36.8 "	9x6	9½	10x8	10½	10x8	10½	5,245	55	6" 36.8 "	8x8	9½
7,140	60	6" 36.8 "	9x7	10	10x10	11	10x10	11	5,955	60	7" 45.0 "	9x7	10
7,890	65	6" 44.5 "	10x6	10	12x7	11½	12x7	11½	6,580	65	7" 45.0 "	10x6	10
8,955	70	7" 45.0 "	10x7	10½	12x8	12	12x8	12	7,470	70	7" 45.0 "	10x7	10½
9,700	75	7" 45.0 "	9x9	11	12x9	12½	12x9	12½	8,090	75	7" 52.5 "	10x8	11
10,765	80	7" 45.0 "	10x8	11	12x10	13	12x10	13	8,980	80	8" 54.0 "	11x7	11
11,940	85	7" 52.5 "	10x9	11½	12x11	13	12x11	13	9,955	85	8" 54.0 "	10x9	11½
13,110	90	8" 54.0 "	10x10	12	12x12	13½	12x12	13½	10,935	90	8" 60.8 "	10x10	12
14,180	95	8" 54.0 "	12x8	12	12x13	14	12x13	14	11,825	95	9" 63.0 "	12x8	12½
15,670	100	8" 60.8 "	12x9	12½	12x14	14½	12x14	14½	13,070	100	9" 63.0 "	11x10	12½

Note:—Loads given in Table are the Safe Uniform Loads that T Rails will carry; other members show sizes necessary for these loads. Timber presumed as seasoned. For green timber use ½ loads. Factor of safety six (about). Fiber stress White Oak—1200 lb. White Pine and Chestnut—800 lb. Timber to be placed narrow side against roof.

never have been lost and also in the purchase of the additional timber at increased prices which should have been bought at the time of first mining.

It is indisputable that the timber we get for mine work is becoming worse continually, and the prices of the good grades of wood are now apparently excessive. It is no doubt true, however, that a place which breaks poor timber and requires cleaning up and, retimbering requires a larger expenditure than the additional amount for good timber in the first place. The latter can, however, be charged against cleaning up falls and timbering, and does not appear on the first cost of the timber.

The mine foremen realize they are getting poorer material and avoid as much as possible the expense connected therewith, frequently or rather commonly pulling down loose material, often thereby exposing a fireclay or "soap stone" which rapidly disintegrates upon coming in contact with the air. This type of roof is quite common in considerable territory of the Fairmont region.

Upon a recent investigation of three different mines in this field, made expressly for the purpose of inspecting timber conditions, with W. M. Foerster, forester for the Consolidation Coal Co., in Kentucky, the writer visited places in which props had been set in 1906, 1908, 1910, 1912 and 1913.

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use of sound caps. Evidence of this was also found, for in one mine small caps or none at all were placed over the posts; consequently comparatively new props were split at the top while in another mine heavy caps were used over props which had been standing since 1906. Incidentally it might be well to mention that the latter were located in a room which had been boarded nearly shut.

BEAMS SUFFER LIKE POSTS

Timbers used as beams no doubt suffer the same conditions just recited. However, little data were available from which any deductions could be made, but the facts found on this inspection show what may be expected.

Take, for instance, places on the main entries. Is it worth while to use wood, especially as a beam, for supporting the roof? Another important question is, when is the proper time to do the timbering, before or after a fall? Going through a mine you will frequently find a 3x5-in. wooden mine rail across the entry. On a later visit you will perhaps find this has decayed and broken, letting down enough top to require several times as much more timber to hold the place. Would it have been cheaper to have used steel? If the roof is as previously mentioned in this article, it is the writer's opinion that it would.

Take, for example, a roof which disintegrates and where top coal is carried to prevent exposure. Frequently

a clay vein is crossed, leaving an opening to which the air has access. Experience has demonstrated that the *absence* of a clay vein under these conditions is worth about \$100 or more. However, such veins occur and the proper thing to do is to take care of them in due time. That time is as soon as a support can be put under the roof at each side of the clay vein and said vein lagged over.

The suggestion has been made to put a thin coating of cement over such an exposure. This sounds practicable and worth trying. However, should a place like this occur on the main entries, wood should not be used, nor should the mine foreman, nor officials above him, allow the use of steel mine rails for this purpose. A mine rail which is good enough for a roof support is more valuable for the purpose for which it was designed. Of course, it is practically impossible to tell just what load a roof will place on a support, but we know that if a certain wood timber when new has carried certain roof conditions satisfactorily, it is easy to determine the equivalent structural steel necessary to do the same.

THE TABLE IS USEFUL

With this in mind a table has been prepared showing what different sizes of steel rails will support when uniformly loaded; then taking these loads, the sizes of

equivalent standard I-beams and the different wood beams have been calculated. Thus, taking a 20-lb. mine rail it is seen that the safe uniform load it will carry on a 10-ft. span is 1385 lb., then following this line to the right, under the same conditions it is seen that the 3-in. 16.5-lb. I-beam will do the same and save 3.5 lb. per yard, or about 14 lb. to a beam of 12-ft. length. Under white oak is found a 5x4-in. sawed or 5½-in. round timber for this load, while chestnut and white pine require a 6x5-in. sawed or 6½-in. round timber.

Quite frequently a requisition will call for a certain sized timber, say, an 8-in. round timber, to be 14 ft. long, to be used for a 12-ft. span. It is seen by the table that a 4-in. 7.5-lb. I-beam will carry the same load. The importance of the place and the length of time it is to be maintained should govern which should be used. Timber in a mine, if it carries approximately the safe load, will seldom last much longer than 18 months, and the replacement plus the first installation will be more than the cost of placing the steel.

This table is presented with the idea that it will be used by mine officials in the proper selection of material when replacing or retimbering, and to give them some idea what their selection of sizes will carry in the weight of roof supported.

Choice and Care of Grate Bars

SYNOPSIS—Grate bars are cooled by the air passing between them. Where this ventilation is stopped the grate becomes incandescent. The object to seek is a regulation of the air spaces, so that excessive heating at any one place cannot result.

A grate deteriorates faster at the front than at the back end of a furnace, because in ordinary firing more pounds of coal per square foot of grate surface are consumed there, while, relative to the rate of combustion,

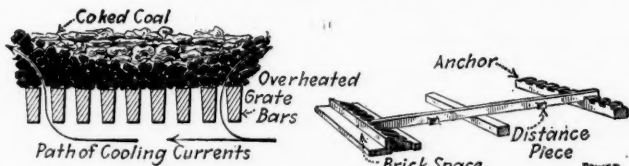


FIG. 1. AIR PATH THROUGH FUEL

FIG. 2. CROSS-BAR GRATE SUPPORTS

less air, which is the grate-cooling factor, passes through the air spaces (R. O. Richards, in *Power*, Jan. 6, 1914). The volume of air through the body of the fire, immediately after a fresh charge of fuel, is insufficient for complete combustion, and the auxiliary supply through the grating of the furnace doors, is so limited in volume that only the fuel immediately back of the doors is benefited.

Heated by surface burning and not cooled by the approach of air from below, the front part of the fire reaches incandescence sooner than any other part of the furnace, with the possible exception of narrow strips next to the heated side walls. But, air admitted above the fuel is not a grate-cooling factor, and the air through the ashpit doors is hindered from reaching the front quarter of the grates because of the sharp deflection re-

quired in the direction of its flow. Thus a strip of grate in the front of the furnace, from 1 to 2 ft. wide, may be subject to higher temperatures, and may therefore deteriorate more rapidly. Either slightly narrower air spaces in the rear of the grates, or more cooling surface, secured by a greater depth of bar, in the front grates, helps this situation.

FIRE EVENLY

Unequal and slovenly firing is also a source of grate deterioration. Where a hole is burnt in the body of the fuel there will be less resistance offered to the current and most of the air will pass at that point, so that the rest of the grate will become too hot. Especially is this true with heavy fires, light steam demand and partly open damper. If the fireman, instead of leveling the fire, fills the hole with green coal, the draft will be almost checked there, and the spot will soon suffer from excessive heat by the coking of the coal on top, and its ignition near the grate. Fig. 1 makes this point clear.

KEEP YOUR GRATE SMOOTH

When a grate-bar warps, it burns and breaks sooner than a bar that has not warped. Bars which arch upward break and burn sooner than those which sag. One of the principal factors of grate economy is the maintenance of an even surface without irregularities in either bars or finger-pieces. In general, the bars wear evenly relative to one another, and, if they be so maintained, good service may be expected, though they may be sagged considerably at their mid length. But when they are disturbed and replaced without regard to their former evenness of surface, you may be sure that they will soon be destroyed. It is as important to number the bars of a grate when it is being removed as to mark the parts

when taking down any apparatus in the engine room. Otherwise, the grate surface will be uneven when replaced (Fig. 3) and the fire will tend to burn the bars, and the fireman's slice-bar be likely to break them.

DON'T USE THIN GRATE BARS

Many engineers infer that a thin bar is preferable since it provides less grate surface in contact with the fire, but reliable tests have proved that the grate receives heat as much from radiation through the interstices, as from direct contact with the burning fuel. Consequently, there being less material and only the same amounts of cooling surface, a thin bar must become many degrees hotter than a thick one, and, not having the rigidity of the latter, will soon bend sidewise, so that two or more come in contact, causing a wasteful enlargement of the air space on one side and serious diminution of the cooling surface on the other. Other considerations favorable to the use of thick grate bars are that they better sustain a layer of protective ash, and maintain the line of fire farther removed from their own surface.

Factors governing the depth of a bar are its length, the



FIG. 3. UNEVEN GRATE BARS IMPROPERLY REPLACED



FIG. 4. SLICE BAR WITH LOWER LIP

amount of fuel burned per square foot per hour, and the width of the air spaces. The latter consideration is rarely taken into account in grate design, but is a factor that materially influences the temperature of the grate. Grates with wide air spaces are subject to more radiated heat than those with narrow spaces and should show more cooling surface or a greater depth of metal in the bar.

ADVANTAGES OF BARS OF STEEL OR WROUGHT IRON

In this country, cast-iron grates have little or no competition; but in Europe steel and wrought-iron grates are used in plants that consider length of service and not initial cost as the true measure of grate economy. The most common form is a series of straight bars extending unbroken from the front arches to the bridge-wall, and supported at the center by a girder. The bars are generally forged 4 in. deep, and about $\frac{3}{4}$ in. thick. They are tightly packed by distance pieces, but are free to expand lengthwise, being anchored near the bridge-wall as shown in Fig. 2. Their chief advantage is, that when warped, they may be straightened and when impaired they may be welded and reformed. They have a smooth surface and the fires are more easily barred. The fire end of the slice bar is formed so that the lower lip slides between two bars (Fig. 4) and cuts all clinkers that may adhere to the sides.

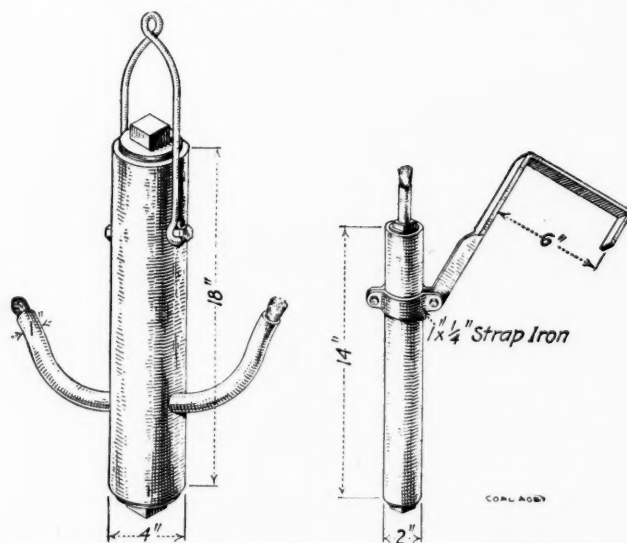
The advantages of electric mine lights as compared with ordinary mine lights are as follows: (1) The absence of oil permits tilting at any angle without injury to the light, thus affording a good illumination for examining the roof. (2) Regular and constant radiance. (3) Safety in gaseous mines unless the bulb is broken. (4) The lamp is not affected by the presence of gas of any kind. (5) No loss of time from accidental extinction. (6) Periodical examinations unnecessary. (7) No smoke.

An Emergency Lighting System

By J. W. POWELL*

The accompanying sketch shows a practical design for a torch to be used in cases of emergency in shaft sinking.

In most cases electric lighting is the system that is used during shaft-sinking operations. However, the time is almost sure to come when this system will go out of commission and have to be overhauled. It was to overcome



A SIMPLE AND PRACTICAL DESIGN FOR A MINE TORCH

all delays on this account that I designed the torches here shown. These lamps are not only more efficient than the ordinary miner's torch, but they are practically indestructible.

They are easily made from ordinary iron pipe, short lengths of which are generally available on the scrap pile of any plant. I have found them to be efficient when put into service.

The Mineral Fuel Co. of Kentucky

The Mineral Fuel Co., of McRoberts, Letcher County, Ky., has six mines in an area comprising, roughly, 5000 acres. Mines 301 and 302 are located at Fleming. Mines 303 and 304, at Haymond, and mines 305 and 306 are in another place not yet sufficiently developed to be dignified with a name. Only Mine 301 is producing, the coal going to markets in the Middle West. The mines are located on the Lexington & Eastern extension of the Louisville & Nashville R.R., in an extremely hilly country which is, strange to say, thickly populated.

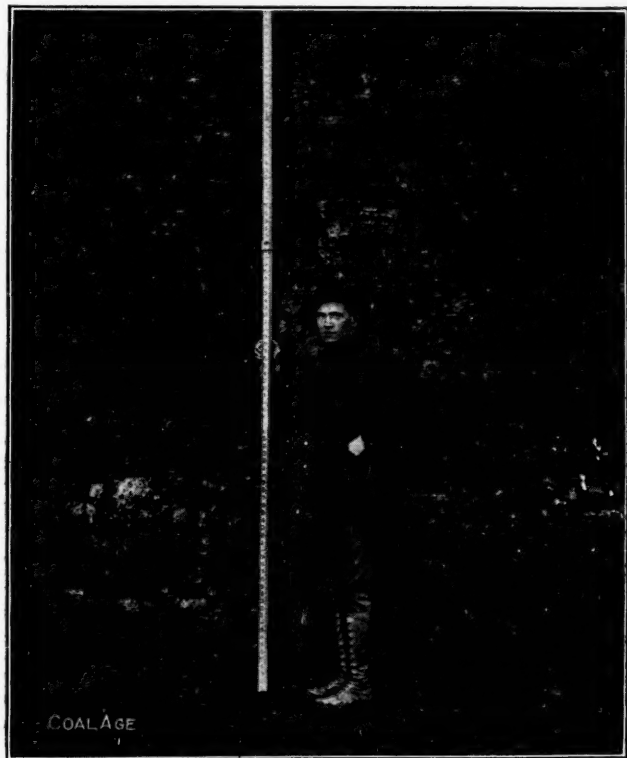
At the town of Fleming, 200 houses have already been constructed and all of them are occupied. A big company store, an office, an amusement hall, and a municipal building are under construction. A small water system will be provided next spring. An apparently unlimited amount of water can be obtained from deep wells. No amount of hand pumping has been able to lower the water level.

At Haymond, to date, there are but 60 buildings, but the number will be increased to 300 later. At Mines 305

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and 306, the town will consist of two or three hundred houses. At Fleming, 240 more houses will be built and perhaps another 30 will be needed. Wherever mines are opened, the roads have to be built and churches and schools erected by the company. The country is well timbered, the oak being especially fine and securing a high price in the market. The company hopes to have a baseball league next season. Within the next two years this company will probably have the largest output in Letcher County.

The illustration shows the coal at Mine 304, Haymond, Ky. The coal is 8 ft. 6 in. thick with a 5-in. band, which



THE 102-IN. COAL BED AT HAYMOND, KY.

splits into laminae. This is located at the middle of the seam. The band gives 48 per cent. as much heat as coal. The analysis of the whole bed from top to bottom, excluding the band mentioned, is as follows: Moisture, 1.94 per cent.; combustible volatile matter, 34.05; fixed carbon, 61.13; ash, including sulphur and phosphorus, 2.88. The sulphur runs 0.45 per cent. and the phosphorus, 0.002 per cent. The fuel is one of the best coals to be found anywhere for coking or metallurgical purposes. It is a fine splint coal for domestic use.

Metal-Filament Lamps at a Colliery

Perhaps the last place in which one would expect to find metal-filament lamps installed is at the surface plant of a coal mine. A colliery that has come to recognize the economy to be derived from the saving in current consumption by the use of the strong metal-filament lamps of today, which has been found to more than balance the losses due to breakage of the filament from shock and vibration when the lamps are properly installed, is the Askern Main Colliery, near Doncaster, England. At this

installation, which includes two splendid Yates & Thom winding engines of 3000 hp. each, and one of the most up-to-date screening plants in the country, electric incandescent lamps of the drawn-wire-filament type are used exclusively, on the surface. The lighting is on a 110-volt alternating-current system. In the power and air-compressor-engine house, and in the winding-engine houses, wall fittings of the ironclad, cyster-shell type are mounted, at regular intervals, around the walls, each mounting containing a 40-watt, Westinghouse, Auriga lamp.

The screens, in which strong vibration must always be expected, are lighted by metal-filament lamps suspended from the galvanized conduits by flexible devices, whereby shock and vibration are largely eliminated, the lamps being mounted in ironclad fittings. The shops, sidings, boiler house, and other parts of the plant, are also electrically lighted by the same metal-filament lamps. The outdoor lights, which are high-candle-power units, are replacing the flame-arc lamps previously used and are said to give superior results.

There is scarcely a doubt but that, by suitable installation, care being taken to avoid damage to the lamps by excessive vibration, metal-filament lamps will pay from two to three times their initial cost, by the saving in current consumption as compared with carbon lamps, and the authorities at Askern are to be congratulated on the move they have made in the direction of better and cheaper lighting, a move which will doubtless be followed by other progressive mines.

The Gary National Bank

The village of Gary, W. Va., has but one industry—coal mining—so the business of the Gary National Bank is almost entirely with miners and not with farmers, or, as they are often called in that district, “sagers.” The following figures are those for November, 1913, and the figures cover solely savings and not current accounts.

There are 377 accounts held by foreigners, representing 74.22 per cent. of those on the books of the bank, 109 held by native whites, representing 21.44 per cent. of the accounts, and 22 held by colored people, representing 4.34 per cent. of the accounts. In all, there are 508 accounts.

Put in another way, deposits aggregating \$114,529.05, or 74.73 per cent. of the total, are held by foreigners; \$33,991.02, or 21.16 per cent., are held by native whites, and \$4778.19, or 3.11 per cent. are held by the colored depositors. Thus the average deposit of the foreign born is \$303.79, of the native white, \$311.84 and of the colored, \$217.19.

The greater number of deposits held by foreigners is explained partly by the larger number of these men employed. The foreigners compose 53 per cent. of the men engaged, the native white 23 per cent. and the colored 24 per cent. It will be seen, however, how much more ready the foreign-born are to save money.

The bank is owned by individuals, some of whom are company employees, but it is in no way controlled by the operating company, which is, as the reader will recall, the United States Coal & Coke Co. The bank pays 3 per cent. interest semi-annually on deposits. As 3087 men were working for the company in November, 1913, 16.4 per cent. of them must have been depositors at this bank. The deposits would probably be even larger if the purchase of U. S. Steel Stock were not so popular.

Byproduct versus Beehive Coke Ovens

BY HENRY S. GEISMER*

SYNOPSIS—It is pointed out that the total additional cost of an investment in a byproduct-oven plant as compared with a beehive-oven plant can be overcome in a period of five years' service. The greatest difficulty in many instances lies in the large initial investment that is required to put in a modern byproduct-coke plant. A 13-ton byproduct oven will cost about \$14,000 as compared with a cost of \$600 for a 6-ton beehive oven.

✽

American blast furnace men have displayed great originality and progressiveness in most lines, but in adopting byproduct ovens, they have trailed far in the rear.

It is not quite 20 years since the first oven of this type was built in the United States, and it is scarcely 10 years since the average furnace-man was convinced that byproduct coke could compare favorably with beehive coke. So widespread was this unwarranted prejudice, that even now the fellow who has not kept in close contact with furnace progress does not realize that the two cokes are of equal value.

In passing, we will briefly note the three principal causes of unsatisfactory results, during the ten years, from 1894 to 1904. They were:

1. Failure to realize that byproduct coke pushed out of the ovens mechanically and loaded mechanically does not receive the effective screening given to beehive coke by hand forking. As a consequence, coke containing a large amount of ash and braize was delivered to the furnace from such ovens, and coke consumption became excessive and the working of the furnace erratic.

2. Ignorance in regard to the effect of long or short coking hours. The man accustomed to 48-hour and 72-hour coke accepted the 24-hour coking time of the byproduct men, reluctantly, but when they tried to reduce this to 18 and 20 hours, he lost his nerve and refused to be drawn further into argument. Today, the only objection to a still further reduction of coking time is the fact that, beyond a certain limit (about 18 hours), the quantity of tar and ammonia recovered is reduced; however, as the amount of surplus gas is increased, this results in little change in net revenue at plants where the surplus gas is in demand. The quality of furnace coke is improved by higher heats and shorter coking hours, as it is larger, tougher and more porous.

3. Variation in the percentage of moisture contained in the coke, due to the manner of quenching. When coke was quenched in the beehive ovens, great care was required, or the oven floor would become chilled. On the byproduct yard, little attention was given to the quenching, except where the coke was to be loaded into wooden racks; in that case, the coke was literally "soaked," to prevent the possibility of enough fire remaining to set the rack on fire. Excessive moisture is especially objectionable in foundry practice.

FORMER ARGUMENTS NOW APPEAR LUDICROUS

Now that all of these points are fully understood and

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properly handled, some of the arguments made by our furnace men against the byproduct plant, during the period from 1894 to 1904, appear quite laughable, to say the least. At the present writing, some of these same managers seem to be in danger of going to the other extreme, in insisting that all beehive-oven plants be immediately abandoned.

It is doubtful if many more beehive-oven plants will be built in America, but it does not necessarily follow that we are justified in advocating the abandonment of beehive ovens, now in service in certain districts under peculiar advantageous local conditions, before they are worn out.

General statements as to byproduct practice and costs are plentiful, but figures giving actual results are hard to obtain. Most anyone connected with the iron industry will assure you that the byproducts are of sufficient value to offset the cost of coking and the value of the coal consumed in the oven, but if you attempt to go farther and inquire as to the value credited to the excess gas, or as to the cost of the byproduct plant, or the manner of arriving at the depreciation of the plant, you'll realize the truth of our statement.

Advocates of the beehive type of oven frequently use this as an argument against the byproduct men, but the argument is hardly legitimate. Here is the way one byproduct man puts it: "There are, at the present time, only 35 byproduct plants in this country in actual operation and they produce 22 per cent. of the total coke; compare this with the hundreds of beehive plants and their multitude of superintendents, past and present, who are or have been furnished with complete cost figures of their product, then remember that it is about impossible to locate an ex-official of a byproduct company in this country; do you wonder then, that byproduct figures are difficult to obtain?"

The following figures have been compiled from actual cost sheets and statements of several large plants in different parts of the United States and are submitted as a guide to engineers, who may be called upon to inquire into the advisability of installing byproduct ovens.

Accurate figures suitable for the United States could only be derived from study and comparison of large numbers of plants over a term of years. In the United States we only now possess the requisite number of plants and they, therefore, are short of years.

ASSUMING APPROXIMATE VALUES

Likewise, it would be impossible to arrive at an absolute value for gas, or the actual number of cubic feet of surplus gas per ton of coal coked, or the number of tons of tar and ammonia byproducts recoverable, that would apply to all coking coals in the United States, but values can be assumed for such factors that will represent at least a suggestive average for the coals now being coked in the States of Pennsylvania, West Virginia and Alabama. The writer believes that the following assumptions are conservative and may be used for estimating purposes, in the states mentioned above.

1. About 4000 cu.ft. of surplus gas will be produced per ton of coal coked.

2. Each cubic foot of gas is the equivalent of 550 B.t.u.'s, or for each ton of coal coked, we will have a surplus power of 2,200,000 British thermal units.

3. Approximately 5 gal. of tar will be recovered for each ton of coal coked.

4. About 14 lb. of ammonium sulphate will be recovered per net ton of coal coked.

We are now in position to arrive at a value for the byproducts. We require:

"A" Value of the gas.

"B" Value of the tar.

"C" Value of the ammonium sulphate.

There are other byproducts such as creosote light oil, benzol, pyridine oil, etc., recovered by some plants, but the practice is not general enough to warrant consideration in this discussion.

"A." The gas may be used under steam boilers, to replace coal firing, or it may be used direct in billet-heating furnaces, rod-mill heating furnaces, etc. To arrive at a value for the gas, as a boiler fuel, let us assume a boiler horsepower to be valued at \$25 per annum; then 4000 cu.ft. \times 550 B.t.u.'s per cubic foot = 2,200,000 B.t.u.'s per ton of coal coked. If we assume a combined boiler and engine efficiency of 8 per cent., we would have to coke 127 tons of coal, to produce each yearly boiler-horsepower \$25.00

$\frac{25.00}{127} = 19\frac{1}{2}c.$ = value of gas per ton of coal coked, or 28c. = value of gas per ton of coke produced. Each 1000 cu.ft. of gas would be worth 4.9c.

To arrive at a value for the gas under heating furnaces, let us assume that the coal to be replaced is worth \$1.50 per ton. Experiments have shown that 1000 cu.ft. of coke-oven gas, in billet and rod-mill heating furnaces, will replace about 60 lb. of coal used in a gas producer. With coal at \$1.50 per ton, each 1000 cu.ft. of gas would be worth 4 $\frac{1}{2}c.$ If the gas were used in connection with gas engines, it would have a higher value than for either purpose mentioned above, but as gas engines have not met with favor in this country, as yet, no comparison will be attempted.

COKE-OVEN GAS FOR ILLUMINATING PURPOSES

Another profitable use for coke-oven gas is for illuminating purposes. The minimum value for the gas for illuminating purposes would probably average around 3 $\frac{1}{2}c.$; the maximum value might be much higher, depending entirely upon the manner in which the gas was sold to the ultimate consumer and whether it would have to compete with a natural-gas supply. These factors vary so with different localities that no general values can be assumed.

Average figures for a number of different plants would seem to justify minimum values of 55c. for ammonium sulphate and 17c. for tar byproducts per ton of coke coked in byproduct ovens, estimating tar at 2 $\frac{1}{2}c.$ per gal. and ammonium sulphate at 2 $\frac{3}{4}c.$ per pound. Most men who have investigated the possibility of over production in ammonium sulphate and tar, due to the rapidly increasing number of byproduct ovens, are of the opinion that the demand for these products will increase faster than the supply can possibly be met.

We have then the total value of byproducts which are as follows:

Gas	\$0.28
Ammonium sulphate	0.55
Tar	0.17

If the coal as charged to the ovens is valued at \$1.35 (this value is variable, ranging from \$1 to \$1.50 in different localities), we must add about 30c. to the above, as a saving produced by the byproduct oven per ton of coke produced, on account of the higher yield, or we have a total credit item of \$1.30 per ton of coke produced by the byproduct oven. This assumes that the cost of coking in the beehive oven is equal to the cost of coking in the byproduct oven, including total cost of manufacturing the byproducts. This assumption agrees pretty well with average practice. This credit item of \$1.30 is not a net gain in favor of the byproduct men, however, as it does not take into account the higher first cost of the byproduct oven.

A 13 $\frac{1}{2}$ -ton byproduct oven costs approximately \$13,750 and is capable of producing approximately 9.45 tons of coke in 18 hours or 12.55 tons in 24 hours. A 6-ton beehive oven costs \$600 and produces 1.8 tons of coke per 24 hours. One byproduct oven would then be equivalent to 7 beehive ovens, or an investment of \$13,750 in byproduct ovens would produce coke equivalent to a \$4200 investment in beehive ovens. Assuming 6 per cent. interest and a $\frac{1}{2}$ depreciation on this additional investment, we would have a loss of \$1368 per year, on the byproduct oven. We can now tabulate the gain and loss for an oven capacity of 12.55 tons of coke per day.

320 working days \times 12.55 \times \$1.30 = \$3852 net gain.

Or if the byproduct oven could be run 320 days per year for 4 years, it would practically wipe out the initial investment.

Next let us assume that the surplus gas has practically no value (this would be true for many localities), we would then have:

320 \times 12.55 \times \$1.02 = \$4096.

\$4096 profit — \$1368 loss = \$2728 net gain.

TOTAL COST OF INVESTMENT WOULD BE OVERCOME IN FIVE YEARS

Under this condition, 5 years' total service would overcome the investment for the byproduct oven. If we now take into consideration the fact that in some districts ovens cannot be operated much over one-half of the time over a period of years, and that under such conditions depreciation is much higher, it becomes evident that it is doubtful if all coke producers would be justified in abandoning beehive ovens now in service.

Even with most favorable conditions for the byproduct plant, it is possible that the initial investment would be so large that a particular coal company could not raise the required capital; while it still might finance a beehive-oven plant and produce coke at a fair margin on the total investment.

In the final analysis, it can be proved that the owner of the byproduct oven can sell coke below the cost of manufacture to the beehive-oven plant. The same supremacy is true of the large, strictly modern steel plant, as compared to the small (result of years) steel plant, or of the large department store, in contrast to one-man merchandising. Many believe, however, that if in any industry the possessors of the "whip-hand" reduced their selling costs to a point where the struggling ones should be eliminated, they would eliminate themselves automatically, without any assistance from an antitrust law.

West Virginia's Foreign Rivals in the Pacific Markets

BY W. A. McCORKLE*

SYNOPSIS—The author declares that the high cost of Welsh coal and the inferiority of all other foreign fuels will cause them all to give way in the Pacific market to the coals of West Virginia. The competitive coals of the United States will be treated in another article.

3

Generally speaking, the coals of West Virginia will be the chief beneficiaries by the construction of the Panama Canal. By reason of their nearness to market, cheapness of production and high availability as steam producers, they will largely be the coals used in this great distributing center. In these great markets, around which we are seeking to throw our strong arms, competition with West Virginia coals must be divided into two classes:

First, that which arises from competition of Australia, Great Britain, Japan, South America, China, Vancouver Island and South Africa.

The second class arises from rivalry in our own country, and may be roughly stated to consist of competition from Virginia, Pennsylvania, western Maryland and the Alabama field.

OUR WELSH RIVALS

The Welsh coals for years have dominated the steam commerce of the world. Relatively speaking, it is only lately that our coals, even by our own Government, have been considered the equals of those produced in the Welsh mines. Even today, the Welsh coals are generally better cleaned and are better prepared than the West Virginia product, and in most instances they have been rated five per cent. higher than our New River or Pocahontas coals, although where forced draft is needed, those fuels are the equals of those produced in Wales. One proposition is absolutely unquestioned: That no other coals can compete on an equal basis with the New River, Pocahontas and Welsh coals. As to competition, let us consider some figures:

The best Welsh coals f.o.b., at Cardiff, exclusive of wharfage, were quoted Nov. 7 at \$4.80 to \$4.92 per ton; best dry coals \$4.32 to \$4.56, and best Monmouthshire \$3.92 to \$4.14. New River and Pocahontas coals at Hampton Roads were quoted at the same time at \$2.85 to \$3.00 per ton, with a distance of 4591 miles from Liverpool to Panama, as against only 1778 miles from Hampton Roads to the same point. Can there be competition with such conditions? Charter rates quoted Nov. 26, 1913, are as follows:

From Cardiff:		
To Rio Janeiro	15s. 3d.	(\$3.71)
To Buenos Aires	14s. 6d.	(\$3.53)
To Santos	16s.	(\$3.89)

One charter was made last week for the transportation

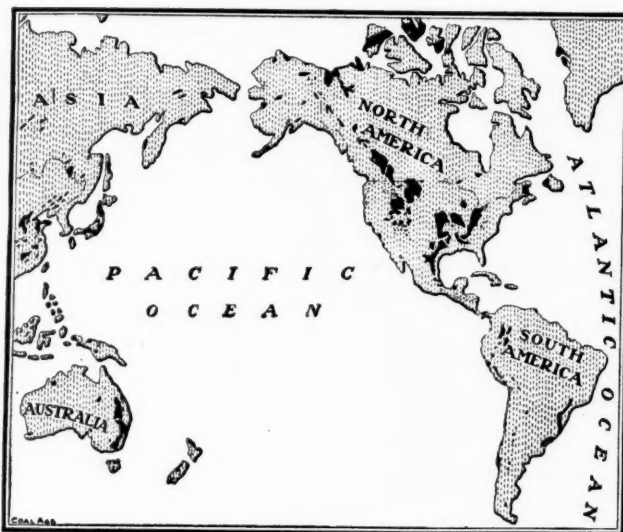
*Ex-governor of West Virginia.

Note—Abstract of second part of an address entitled "The Relation of West Virginia Coals to the Panama Canal," read before the West Virginia Coal Mining Institute, Charleston, W. Va., Dec. 8, 1913. The first part entitled "The Price War in the Markets of the Pacific" appeared Feb. 14 in Vol. 5, pp. 284-285.

of 5500 tons from Hampton Roads to Rio Janeiro at 16s. 6d. (\$4.01). On the basis of this last shipment, New River and Pocahontas coals were delivered in Rio Janeiro at a cost of \$7.01 as compared with \$8.63 as the cost of the best Welsh steam coals. These ports are on the Atlantic but they roughly exhibit the opportunities for the sale of coal on the opposing Pacific coasts after the canal is constructed.

Is it reasonable to suppose that West Virginia thrift and enterprise will allow Welsh coal in these markets to compete with our coal, when the Welsh product costs much more than our product at the pit mouth, and \$2.00 more than our coal at the loading piers on tide-water?

It is true that the great carrying trade of England



THE COAL FIELDS OF AMERICA AND THOSE BORDERING ON THE PACIFIC OCEAN

will always allow outgoing coals to be carried as ballast to various places within the zone of competition as for instance, to obtain nitrates in Chile and beef or wheat in the Argentine. Yet it is a fact, well known to the trade, that the carrying of coal as ballast and not as a business is gradually drawing to an end. Men must have coal delivered at a certain price, at a certain time, and not delivered on the mere chance of a return cargo.

THE AUSTRALIAN COMPETITION

Another great competitor with our coal in these markets is the Australian coal. Sydney will be 1422 miles further from San Francisco than Newport News will be, when the Panama Canal is constructed, the distances being from Sydney to San Francisco 6522 miles and from Newport News to San Francisco, 5100. And when the canal is complete Sydney will be 1341 miles further from Valparaiso, Chile, than Newport News, the distance being from Sydney to Valparaiso 6319 and from Newport News to Valparaiso 4978 miles.

Comparing the quality of the Australian coals with those of West Virginia, we find:

Coal	Moisture	Volatile Matter	Fixed Carbon	Ash	Sulphur
Australian	1.92	3.509	54.08	2.91	0.541
New River	0.983	20.805	74.983	3.229	0.621

Using one cord of seasoned white oak as the unit of measurement, the U. S. Navy Department has determined the following equivalents:

New River	Average of 7 tests, 1676 lb.
Australia	Average of 19 tests, 2225 lb.

Worked out by proportion it appears that 1000 lb. of New River coal has the same fuel value as 1327 lb. of Australian coal.

THE AUSTRALIANS CONCEDE PROSPECTIVE DEFEAT

As to Australian competition with the coals of the Eastern states, the Australian commissioner, sent to investigate the effect of the opening of the canal upon the Australian coal trade with American in his report to the Premier, says:

The ocean haul averages only 3370 miles to the west coast ports of South America, while the distance traveled from New Castle, New South Wales, to those harbors averages 7200 miles. Can we compete? It looks to me impossible. It certainly is quite impossible if any reduction or rebate of the canal dues is made to American ships, and even if they are called upon to pay full rates for the use of the canal, the position is most serious. As far as the San Francisco trade is concerned, we may at once conclude that it is gone, and I think this also applies to the trade that we do with the Hawaiian Islands. This trade will pay no canal dues at all.

THE JAPANESE AS RIVALS

The Japanese are other enterprising people who might prove important rivals if their coal were generally of high grade. The seams are usually small and the fuel is often a dirty coal of steaming grade and high in ash and sulphur. In the best fields the coal is mined by shafts, some of which are a thousand feet deep. All the mines are wet; the price of the Japanese coal at the pit mouth, notwithstanding the cheap labor, is higher than that of West Virginia coal at the mouth of the mine. A fair illustration of the comparative value of Japanese coal is shown by the following analysis:

Coal	Moisture	Volatile Matter	Fixed Carbon	Ash	Sulphur
Japanese	5.06	44.36	40.81	8.75	1.39
New River	0.983	20.815	74.983	3.229	0.621

The Japanese coal will compete in the Far East, but not with ours or that of Australia in markets to which Japan has less convenient access.

The Vancouver Island coal is expected to compete with our coals in the markets of the Western coast, and in the great bunker trade which will ultimately arise from the use of the canal by vessels going to the Northern and Middle East. Many vessels intended for that great market, especially Japan, will pass through the canal, proceed up the coast, land at San Francisco, and there coal. They will then take the route directly across the ocean to their destination.

San Francisco necessarily will become, from its position at the end of the great trans-American railroads and by reason of its position in reference to the Panama canal, a great coal-distributing point. The question of the ability of West Virginia to compete with the Vancouver coal is one demanding careful consideration. Ten tests by the United States Government, of the coals shipped under the trade names of Comox, Nanaimo and Wellington analyze as follows: Moisture, 1.600; volatile matter, 30.251; fixed carbon, 56.688; ash, 11.461; sulphur, 0.512.

The Navy Department, in its table of equivalents, us-

ing one cord of seasoned white oak as the standard of fuel measurement, shows that 1676 lb. of New River coal equaled one cord of oak, while it required an average of 2325 lb. of Comox, Nanaimo and Wellington coal to equal that same unit of calorific power. In other words, it takes 39 per cent. more Vancouver coal to give as much heat as that from the New River.

The price of Vancouver coal, at the loading port, free on board, was from \$3 to \$4.50 per ton, according to September quotations. The sailing distance from San Francisco is about 950 miles. I think we can safely estimate the charter rates at about \$1.50 per ton. This makes the cost of Vancouver coal alongside at San Francisco, not less than \$6.00 per ton. New River and Pocahontas coal can be delivered at San Francisco at the same price, omitting tolls through the canal, but our smokeless coals have an efficiency value approximately 40 per cent. greater than the Vancouver coals. This statement of relative cost and quality applies to the whole Western coast of the United States, and gives West Virginia an absolute determinable advantage over the Vancouver coals at San Francisco and in Mexico, Central and South America.

CHINA, SOUTH AFRICA

There are other competitors of indeterminable importance—China, and South Africa. As to China, we can only surmise. She has enormous areas of coal which at some day may compete along the broad shores of the Pacific with any coal now in the market. What the future may bring forth as to this country we do not know.

South Africa is producing some good coal under intelligent management, but those who know, believe that because of the long distance to market, it will not compete with the West Virginia coals in the markets on the American continent.

At times reports have come of good coal in South America. Investigation has never proved the report true. The Chilean coal is dirty, steams badly, and deteriorates rapidly in the air. It is reported that there are some splendid coals in Venezuela and good samples have been obtained, but if the information is correct, it will be many years before transportation facilities are secured for the carriage of these coals to the coast. Whether they will be competitive is one of the indeterminable questions, but reasoning from our knowledge of the known South American coals they can never compete with West Virginia fuel in the world's markets.

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Ventilation of Alabama Mines—A section of the Alabama laws reads: "The operator or superintendent of every coal mine, whether shaft, slope, or drift shall provide and hereafter maintain, ample means of ventilation for the circulation of air through the main entries and all other working places to an extent that will dilute, carry off and render harmless the noxious gases generated in the mines." Held: "This statute is not as terse and clear as it might be, but it was evidently the intention of the Legislature to require mine operators and superintendents to keep their mines ventilated to the extent of rendering them harmless from noxious gases generated therein. The Legislature meant more than merely requiring the nondelegable duty of furnishing the means for ventilation. * * * The statute does not make the mine owner an insurer, under any and all conditions, against mine explosions, or make him liable for certain unavoidable accidents. * * * It does not make him an insurer against gas not generated in the mine but which is released or enters therein from its natural state by moving the layers of coal which held it in the gas pockets," (Alabama Supreme Court, Walker vs. Birmingham Coal & Iron Co., 63 Southern Reporter 1012.)

Prospects for Workmen's Compensation in Kentucky

By G. D. CRAIN, JR.*

SYNOPSIS—Four bills are presented for workmen's compensation. That openly fostered by the operators protects them against loss when an employee is injured who has refused to elect to come under the compensation law. The loss has, in that case, to be paid out of the general fund created under the act presented, if that act is passed.

The Kentucky legislature, which is now in session, has before it no less than four bills dealing with the important subject of workmen's compensation, upon which there has heretofore been no legislation in the state. That so many bills have been introduced exhibits the interest felt in the matter at this time, and it seems fairly certain that an act will finally be evolved and adopted, although it is far from sure what its principal features will be.

The coal operators of Kentucky, acting practically as a unit, are in favor of legislation of this kind. They have sponsored a bill upon the subject, which has been introduced in the Senate. This sentiment in favor of a compensation law is almost unanimous. Though the four bills to which I have referred differ rather widely in some of their details, there is little room to doubt that mutual concessions will enable a reasonably satisfactory act to be framed.

OPERATORS ADVOCATE WORKMEN'S COMPENSATION

The general support which is being accorded to the idea by the coal industry, as well as by other industrial interests in Kentucky, indicates strikingly the progress which has been made by the business world. Formerly legislation of this sort was bitterly opposed by employers on general principles. They made no real effort to arrive at a logical understanding of the theory of compensation, or to forecast the result of such laws.

Coal operators in Kentucky, however, appreciate the benefits which will result to them from the enactment of almost any reasonable system of compensation. They have suffered severely during the past few years from the verdicts rendered by sympathetic juries in favor of miners injured in the course of their employment. Looking at the matter, therefore, from a purely selfish standpoint, the coal trade is inclined to view a workmen's compensation act as a grateful relief from conditions which have become actually oppressive. They do not regard it in any way as a burden.

It has been reported several times during the past year, for example, that in the eastern and southeastern Kentucky fields, where the work of the sympathetic jury has been especially conspicuous, not a few operators have found themselves so burdened by verdicts for damages that they have been compelled to cease doing business until some changes should occur. They are said to be waiting either till the temper of the juries becomes more favorable, or till the laws covering the situation are changed. The present prospect in the latter direction is, therefore, regarded with distinct favor by the members of the industry who are located in those parts of the state.

COMPENSATION FOR JOHN COLE, MINER, WAS \$20,000

A particularly striking instance, still fresh in the minds of the operators, is that of John Cole, who was killed while working in an eastern Kentucky mine. His administrator sued the company, and as there was an issue of fact, the case was submitted to the jury, and his estate received a verdict for \$5000.

The company appealed, and considered itself fortunate to secure a reversal of the judgment rendered in accordance with this verdict. On a second trial, however, the verdict and judgment were for \$20,000, and it appeared that there was no error of law committed, as the trial was sustained by the Kentucky Court of Appeals. Curiously enough, however, Cole's "buddy," who was working in the same room with him, and was also killed, was estimated by a jury in the same district to be worth only \$3000 to his estate.

There are numerous other cases on the records of the courts in that part of the state, however, which show equally well the absurd variations in the amounts of damages awarded for injury and death. These differences are without any ascertainable basis except the caprice of the jury.

The injustice of burdening a single company with the compensation of any accident is now recognized somewhat generally, and by none more clearly than by employers themselves. On the other hand, the assurance given the employee by compensation acts that he will not be compelled to subject his rights to the test of litigation, with its heavy costs and inevitable delays, has always been a powerful argument with wage-earners in favor of compulsory compensation.

These considerations furnish ample reason for the fact indicated, that there have been four bills introduced in the Kentucky legislature now in session, and for the further interesting fact that these bills are presented in behalf of the labor interests, the coal operators, the Kentucky Manufacturers' and Shippers' Association, and the liability insurance companies, respectively. It is generally understood that these several parties are behind the different bills, and the drafts of these proposed enactments consequently indicate what each of these several bodies conceives to be the plan best suited to its interests.

STATE INSURANCE VERSUS BONDING AND PRIVATE INSURANCE

The state insurance plan, which is a conspicuous feature of the Ohio act, is common to the bills presented by the coal operators and the labor leaders—a fact which should furnish some food for thought. It now seems probable, however, that another plan will be enacted. By this, the employers will be allowed to give bond to the state that they will make the stipulated compensation directly to the employees, or will be permitted to take out insurance in an approved liability company.

One of the provisions of the bill prepared by the mining interests which is entirely original, is that contained in Sec. 33. It provides, briefly, that in cases where an em-

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ployee who has refused to accept the provisions of the bill with reference to compensation, giving notice to that effect as provided therein, is injured and brings suit in the courts to recover damages, the employer shall have the full benefit of the common-law defenses in suits by a servant against a master. And, further, it is stipulated that even should such an employee recover in such a suit a greater amount than that provided by the compensation act, the amount of the judgment shall be paid for on behalf of the employer out of the fund provided by the contributions of the industrial interests of the state. The intent of this provision is that the employer shall be protected in all cases where he agrees to accept the provisions of the act.

THE JUSTICE OF FORCING THE EMPLOYEE TO AVAIL HIMSELF OF THE ACT

This provision is expected to meet with general approval, inasmuch as it serves to place employer and employee on a level. It is pointed out that by the provisions of practically every bill now in force on this subject, the employer is heavily penalized for refusal to act under the provisions of the compensation act, by being deprived of the common-law defenses, whereas there is no adequate pressure on employees to the same end, and no protection to employers against suits by such employees. Of course, it is always possible to discharge those who prefer to rely

on the ordinary course of litigation for their protection, but it can hardly be considered the best possible policy to force operators to that extremity when they desire to safeguard themselves.

Another novel provision presented is that penalizing employers who hire persons under age illegally in dangerous occupations, by making them liable, in case of injury to persons so employed, for an additional amount equal to 25 per cent. of the compensation awarded, to be paid by them directly to the injured person, in addition to any premiums or assessments paid. This is obviously calculated to discourage infractions of the child-labor laws, which are now said to be winked at on all sides, and is likely to meet with the full approval of those interested in the welfare of minor workers.

THE WALTON BILL

The principal feature of the Walton bill, which is that backed by the Kentucky Manufacturers' and Shippers' Association, is the administration of the compensating fund by the circuit judges of the state in the several counties, instead of by any board specially created for that purpose. This eliminates the necessity of paying salaries and other expenses. It also provides a more liberal option as to the acceptance of the law than that left by the Ohio plan, which is held by the manufacturers to be in violation of the Kentucky constitution.

Direct-Current Fields

SPECIAL CORRESPONDENCE

SYNOPSIS—A discussion of some of the difficulties encountered in the operation of direct-current machines and some emergency cures.

Direct-current machines are now so thoroughly standardized and their operation has been a matter of such long standing, that it may seem somewhat surprising that anything of essentially new interest could be found with regard to the practical operations concerned. More especially is this true with regard to the field, inasmuch as although improvements may still be effected in winding and in the precautions necessary to overcome the effect of vibration in the running parts, it would seem as if the field and the field magnets present no items of serious difficulty.

At the same time, it is within the experience of practical electrical men that trouble still arises in the field windings of direct-current generators and motors, and while such difficulties exist, it is not without interest to refer to them in order that the people who have to deal with the operation of such machines be on their guard against any trouble which may arise.

Failures of field insulation at the present day may usually be traced to improper treatment, inasmuch as the materials and methods employed in the manufacture are now so well appreciated that any reputable firm of electrical manufacturers knows well how to turn out its machines with the required factor of safety, both electrically and mechanically.

Unfortunately, however, they cannot guard against improper handling when once the machine is out of their

hands, and in many instances it will be found that the insulation is subjected to unfair treatment on account of the dirt and oil being allowed to deposit itself upon the windings with the inevitable result that in the course of time the insulating fabric becomes rotten and breaks down.

Another well known cause of trouble is the use of improper field switches. It is not, however, proposed to dwell upon the more obvious complaints, but to refer to one or two specific instances of special interest which may afford useful hints to other operators.

Plants are not uncommon where the motive power must not on any account be shut down during certain specified periods. In many industrial operations the quality of the output depends absolutely upon the continuity of the process, and where electric power is employed to operate such machinery it is essential that every precaution be taken to insure proper operation.

In other cases it is possible to shut down for a short time, but should an interruption be of long duration, trouble may ensue. For example, the failure of a motor driving one portion of a conveyor system will involve the accumulation of material at some particular point which will be hard to deal with subsequently. Yet another example which is even more striking inasmuch as it involves danger to human life is that of the ventilation of mines. When men are in the workings their supply of fresh air and the removal of gas which, if allowed to accumulate, will form an explosive mixture, depends on the continuous running of the mine fan. Should this be interrupted for any considerable period it will be necessary to bring the

men to the surface. Should a breakdown occur in the field coils of a motor driving such a ventilator, it is necessary to investigate and rectify it at the earliest possible moment.

In one case, where a short-circuit occurred in a field coil of a large two-pole motor, considerable trouble was experienced, owing to the fact that no spare coil was at hand, and it was necessary to keep the motor going in order to avoid stopping the process for any considerable length of time.

The motor was, therefore, shut down and the fault located. The bad places on the winding were then opened out and separated by means of chips or bits of wood. With this crude emergency repair the machine was again started and run while the new coil was being made. When this was ready the machine was again shut down and the new coil slipped into place and connected up as speedily as possible, when the motor was again started. Owing to this handling of the difficulty, it was possible to keep the process going without serious trouble resulting.

Another incident in connection with the field of a direct-current machine reveals how a small oversight may easily cause great trouble. In this case the defect was magnetic. On starting up a large six-pole generator it was discovered that one of the field coils became hot, the

temperature continuing to rise in spite of careful search, while the other coils remained normal.

The machine was accordingly shut down and the field coil which showed the fault was carefully examined. It was at first thought that there was a short-circuit and that the coil was warming up due to this cause. There was, however, no trouble of this nature.

It was finally discovered, however, that the machine was fitted with trailing pole pieces, and during the erection the pole carrying the coil which became hot was put on the wrong way around. In other words the trailing tip was made a leading tip and there was, therefore, a disturbance of the magnetic field which had its reaction in the heating of the exciting coil. When the pole had been removed and put on in the correct manner, all trouble due to heating of the coil immediately disappeared.

Other instances could doubtless be brought to light where trouble with the field coils was caused by simple faults, but which nevertheless have had a considerable effect upon the satisfactory operation of the machines. The narration of such instances would be interesting, since the interchange of useful information of this nature goes far to correct the impression that electric power can be handled without any technical knowledge.

Explosion-Proof Mining Switch Gear

SPECIAL CORRESPONDENCE

SYNOPSIS—Description of an oil-immersed switch in an extra-heavy cast-iron case for use underground. These cases are built as near air-tight and gas-tight as possible and their sectional construction renders them adaptable to use either singly or in groups.

Because of the fact that in collieries which under normal circumstances can be considered safe, there is a liability that from time to time outbursts of gas may take place, it is necessary to exercise the utmost care and precaution in the design and maintenance of the switch gears of electrical installations. The selection of safe switches means so little in extra cost that it is the best policy to give human life the benefit of any doubt which may arise on the subject when new apparatus of this character is under consideration.

It will be valuable, therefore, to consider a type of explosion-proof mining switch gear which has been developed by Messrs. J. H. Holmes & Co., Ltd., of Newcastle-on-Tyne, England. Fig. 1 shows one of the distribution switchboards installed in a North-of-England mine, to deal with motors at medium or high tension whose situation cannot be considered as permanent.

HOW THE BOARD IS BUILT UP

The board is built up in separate units, capable of being adjusted within wide limits in order to control alternating-current motors or for the protection of circuits up to 200 amperes. The whole gear is inclosed in a heavy cast-iron case, having wide metal-to-metal flanges, with only the operating handle on the outside.

Although the switches, together with the tripping

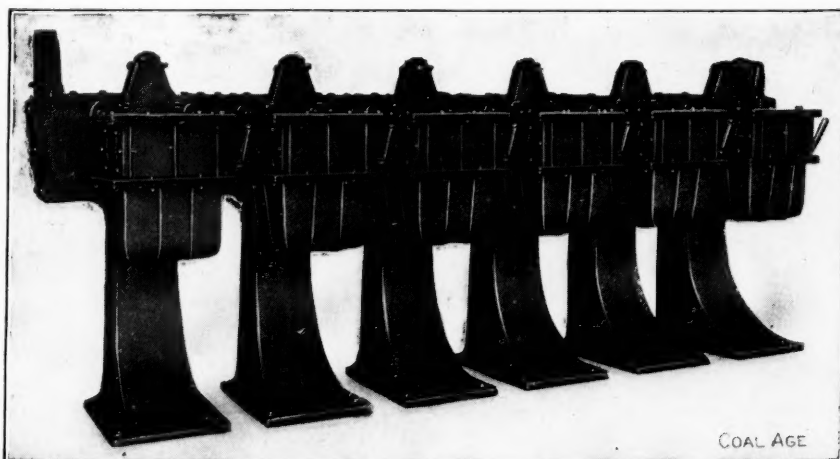


FIG. 1. SIX SECTIONS OF EXPLOSION-PROOF SWITCH GEAR

gears, are immersed in oil and are quite capable under ordinary circumstances of opening the circuit on overload, it is nevertheless quite possible, under certain con-

ditions, in the event of a dead earth or short circuit to draw the arc to a sufficient size to burst through the oil and reach the atmosphere above it.

It is now recognized as being practically impossible to build boxes gas-tight in the true sense of the term. It is hence important that the switch cases should be made sufficiently strong to withstand the force of an explosion caused by an arc igniting any gas they may contain.

Such an explosion, equal, under certain circumstances to a pressure of considerably over 100 lb. per sq.in., as well as the rough usage to which underground apparatus is invariably subjected, calls for heavy castings, strongly ribbed and securely fastened together.

DETAILS OF CONSTRUCTION

The switches are spring controlled, giving a very sudden and quick break. Their backs are provided with machined metal-to-metal flanges arranged to bolt onto the bus-bar chamber, so that the two parts form independent sections. Thus, should an explosion occur at any of the switches it cannot be communicated to any other section. This increases the general safety of the whole gear.

The handle is of the loose pattern, so that it is impossible to hold in a switch on an overload or a no-voltage. It will also trip the instrument if turned in an opposite or contrary direction. The mechanism proper is made an independent part to facilitate manufacture and to give convenience in replacement.

All triggers, catches, etc., are of hardened steel with specially molded insulators for the bridge plate so that all material of a weak nature, such as wood, is avoided. The bus-bar chamber is made explosion proof and is divided up into sections, each section and switch, with its pedestal, forming an independent unit, with the bus-bar attached to porcelain insulators and grouted into the casing so that any section may be withdrawn or removed to any other part of the mine, either to work independently or form part of another board.

The ammeters and voltmeters are independent, watertight cases with sealed glands. They are fitted with Pilkington glazed windows reinforced with wire netting. This maintains the massive appearance of the design.

Cable dividing boxes for multi-core cables are fitted for both the incoming and outgoing leads, with plugs for compound filling boxes having glands to take the lead covering and clamps for the wire armoring.

ANY PROTECTING SYSTEM

Any system of protection may be embodied in this design, the board illustrated being fitted with overhead trips in all three phases, while a no-volt release coil is placed across one phase. The inclosed protecting fuses are fitted within the switch or bus-bar chamber and any system including leakage trips may be incorporated.

An important feature of construction is that all cap-screws used in holding the various parts of the case together are uniform in size, of blued steel, for use with either a box wrench or a screwdriver.

Extensive tests with the most explosive mixtures in a darkened room with repeated ignitions, such as are obtained under natural conditions, have been carried out on all sections of this apparatus in order to prove the satisfactory nature of its design.

In West Virginia, More Accidents Are Reported but Fewer Occur

According to members of the Public Service Commission, the number of accidents, fatal and nonfatal, reported in West Virginia since the Workmen's Compensation Law went into effect, Oct. 1, does not warrant the conclusion that more people are being killed and injured than before.

On the contrary, the reports in the office of the State Department of Mines show that the mining fatality rate in the state in 1913 was the lowest since 1905. The officials believe that, if comparative statistics were available for the nonfatal accidents, a smaller number would be shown.

"Before the law became operative, when we were planning its administration," said a commissioner a few days ago, "the members of the Commission told Governor Hatfield and other state officials that the reporting of all accidents would result in apparently appalling figures. Nevertheless, we decided that there ought to be such a report, so that the records would be complete.

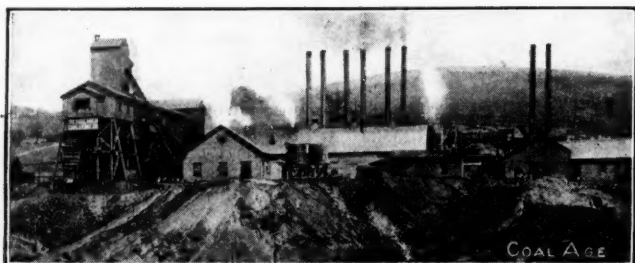
"The impression that is abroad, that West Virginia is passing through a period of killing and maiming, is explainable and it was to be expected. But it is not correct. Every accident that occurs is reported to this office and the clerical force makes a record of it. Newspaper men come here and see that a certain number of accidents have been reported within a specified time and they generally publish the figures correctly. But the reporters don't have the time to go back of the superficial returns. If they did they would find that from thirty to forty per cent. of the accidents reported are of a trivial nature.

"For instance, we can show case after case, where the workmen mentioned in the reports have suffered nothing more serious than a mashed finger. Others may have a cut toe or something of the kind. Before the new law went into effect, nobody thought these accidents serious enough for notice. Now persons who suffer these slight injuries are paid to report them. Before, they were not and they did not take the trouble to do so. Besides there was no office to which these slight injuries could be reported. They help to swell the total but they do not indicate that conditions are worse or even as bad as formerly.

"We know that in the coal industry especially both employers and employees are making special effort to prevent accidents and to reduce the death rate. It goes without saying that these people would not be making this effort to protect the whole body and not to protect parts of it. I have reason to believe that, in all lines of industry, fewer accidents are occurring than in former years.

"I am convinced that the whole change in accident rate is due to more complete reporting. If, in years gone by, it had been the custom to report every accident, the people of West Virginia would not be alarmed at this year's returns. On the other hand, they would feel encouraged. Our experience is like that of every state in the first year of a workmen's compensation law. It is safe to assert that more accidents are not happening, but more are being reported."

Snap Shots In Coal Mining



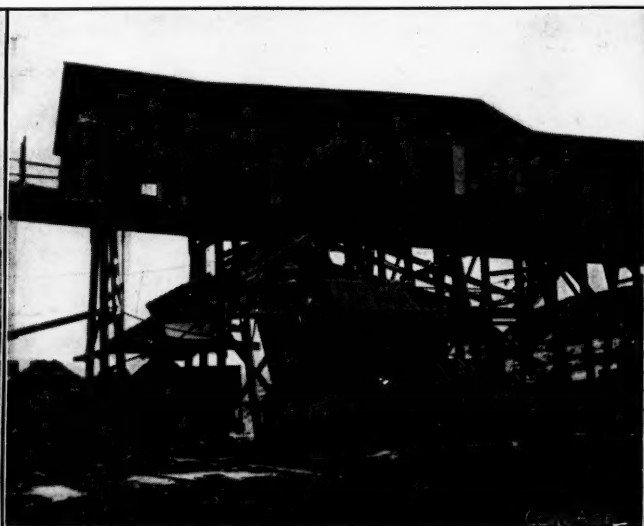
MINE NO. 1, BESSEMER C. & C. CO., RUSSELLTON, PENN.



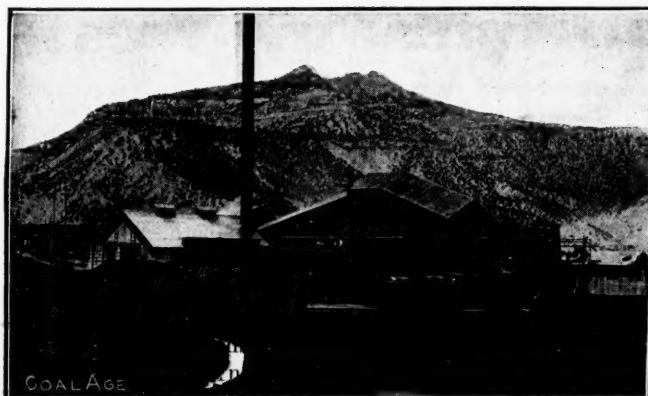
CHARLES, A FAITHFUL HORSE, 30 YEARS OLD, HAS BEEN PENSIONED AND RETIRED BY BRUNER COAL CO., KOKOMO, IND. HE HAS HAULED 300,000 TONS OF COAL



THE PRINCIPAL COAL BED IN THE NEW RIVER FIELD OF WEST VIRGINIA, LIES HIGH IN THE HILLS AT AT MOST POINTS AND IS REACHED BY LONG, STEEP, SELF-ACTING INCLINES



A. C. M. CO.'S COAL MINE NO. 1 AT WASHOE, MONT. D. C. & C. CO.'S TIPPIE AT MINE NO. 4, GLENCOE, WYO.



TIPPLE, YARDS AND POWER HOUSE OF BLACK HAWK COAL CO., BLACK HAWK, UTAH



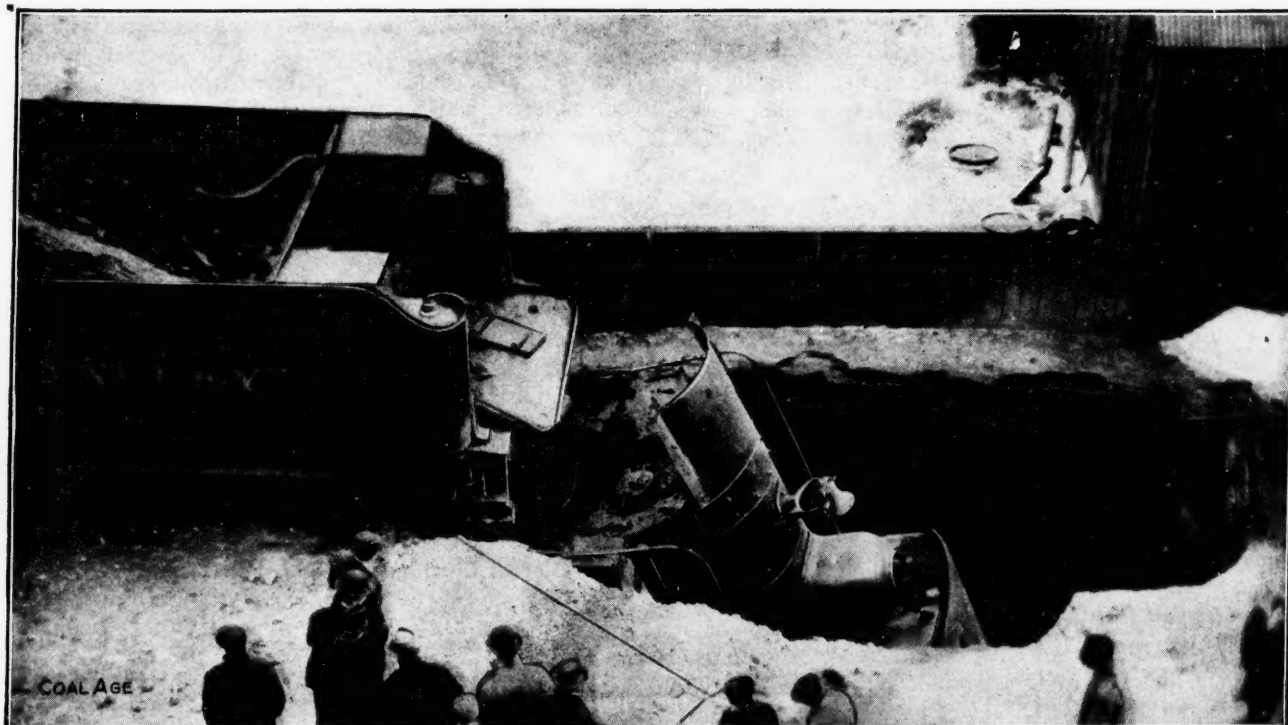
AERIAL-ROPE TRAM BUCKET DEPOSITING REFUSE FROM WASHER, ST. BERNARD CO., EARLINGTON, KY.



MINE STABLE AND MULES BELONGING TO HIGHLAND MINING CO., PROVIDENCE, KY.



A 3-ROOM MINER'S COTTAGE TYPICAL OF HOUSES RENTED BY VICTORIA COAL CO., MADISONVILLE, KY.



THIS ENGINE WAS ENGULFED BY MINE CAVE AT PITSTON, PENN., JAN. 22, 1914. THERE WERE NO FATALITIES, BUT ONE MAN WAS INJURED

Wattenscheid Collieries in Westphalia, Germany

By C. A. TUPPER*

SYNOPSIS—The construction details are in anticipation of long continuance in operation. Coal is hoisted without the use of drums from a depth of 2165 ft. The workmen are given every care, funds for this work being available because prices are regulated by several trusts.

At European coal mines, and particularly in Belgium and Germany, properties are generally regarded and managed as permanent investments, with the expectation that the workings will continue in operation and yield remunerative returns for many years, probably during several generations. Of these a considerable number are owned by large users of fuel, including operators of coke plants, blast furnaces and steel mills.

The mines are conserved in every possible way as resources of great value for the future. Not only is there careful mining underground, mainly on the longwall system modified to suit conditions, but substantial surface buildings are erected, economical power, hoisting, compressor, pumping and ventilating plants provided, favorable housing conditions for the miners and others carefully secured and welfare work introduced to attract and retain an intelligent, permanent class of labor.

One of the best examples of a property of this kind is to be found in the collieries at Wattenscheid, in Westphalia, Germany, controlled by the Rheinische Stahlwerke, Ltd., which were opened up in 1859 and have been producing steadily since that time. The substantial character of the surface buildings and plants is shown in the illustrations on the cover.

The mines are divided into three groups, comprising the north, south and intermediate sections of extensive coal fields, each group having its separate hoisting and air shafts, so that there are six of these pits altogether. At the time of my visit, 29 distinct seams were being worked. These dipped on an average 43, 52 and 78 deg. in the three mining sections respectively.

HOISTING WITHOUT DRUMS

The output of the mines is hoisted by steam-operated sheaves from various shaft partings, which lie at varying depths for the different shafts, with 2165 ft. as a maximum. This is the depth of the seventh level in No. 2 shaft. Development work is being carried considerably deeper. A feature of these hoisting plants is the partial use of the so called "Koepe" system, which is not unlike the "Whiting" arrangement better known to operators in this and other English-speaking countries. The idea of both is to eliminate the use of drums which, in hoists built for great depth, are extremely heavy because the cables are both long and of large diameter. This weight has usually to be accelerated at the time when the load is at its maximum. To save the excessive weight the two systems mentioned have been devised. They are extensively installed in Europe and even in Mexico, South America and South Africa, but have not yet been introduced to any great extent in the mines of this country.

Both systems make use of a continuous cable, to which the two cages are attached, and in both, the hoisting is accomplished entirely through friction between the cable and the driving sheaves. With the Koepe system, as used at Wattenscheid, the rope is carried around a single driving sheave for about 180 deg., while in the Whiting system two driving sheaves are used in tandem, being encircled by the hoisting rope in the manner generally employed for continuous haulage systems. Since with the former arrangement the maximum friction between rope and sheave, which can be obtained in half a turn, limits the rope pull, this system has not ordinarily been found practicable except where a tail rope is used.

It is, however, not only suitable for steam-driven hoists but has found a large field of application abroad in connection with large electric hoists, since the even torque of the motor reduces the danger of rope slippage to a minimum. The principal objection to the Koepe system is its high initial cost and it would only be recommended where a "permanent investment" such as I have indicated, is desired, such as is exemplified in the plant at Wattenscheid. The larger of the Koepe machines at the operation is a twin hoist having 33.46-in. cylinders and 62.99-in. stroke, with a driving sheave of 26.24 ft. in diameter.

RELAY PUMPS AND FANS

The mines are kept free from water, to a depth of nearly 2500 ft., by a system of relay pumping which includes steam, compressed-air and electric pumps. This has resulted from successive additions made during the years when standardization of equipment was not seriously considered. The drainage of the several mines is, however, interconnected, with a number of common sumps, from which any one of two or more pumps can draw, and there is always ample reserve capacity.

The heaviest duty is now performed by an electric pumping plant which raises water from a depth of 1968 ft., with auxiliary suction pumps below that level. It is noteworthy that the motor-driven units include a duplex plunger pump, corresponding to practice which has been successfully inaugurated in this country for pumping from considerable depths. Centrifugal multi-stage pumps are more common, but the plunger pumps, when installed under the right conditions, are apt to show higher economy.

The fans installed are steam-driven units of the Rateau type, and high-speed electrically operated units of the Capell design. The ventilating system is so arranged that in case of the breakdown of any unit the air for its section of the mines can be handled by one of the other fans.

POWER SUPPLY

Compressed air for use in the mines, as well as some purposes above ground, is furnished by two compound, two-stage units which deliver it at 75 to 82 lb. pressure. The motors used for driving pumps, ventilating fans, haulage machines and for various other purposes under-

*2172 East 89th St., Cleveland, Ohio.

ground, as well as for surface tramping, tippie and breaker operation, washing plants, a briquette factory, a byproduct coke plant and apparatus of general utility, are actuated by electric current furnished by a modern steam-turbine and engine-driven power system, the units of which are centrally located.

Various steam-driven sets, as, for example, the steam pumps and engine-operated fans above mentioned, are held in reserve, so as to provide for continued operation and safety in case of any failure of the electric system. The latter, however, has thus far been only partially installed and will gradually be extended to provide for all ordinary operations both above and underground. It is generated as alternating current, motor-generator sets being used to convert to continuous current where necessary. All the steam units, except isolated sets, are connected with a central condensing plant, which is a material factor in securing good economy.

WASHING AND SIZING

A feature of considerable interest to American visitors is the careful washing and sizing of most of the coal. At the three hoisting shafts there are washing and grading plants having an aggregate capacity, when operated full, of about 3200 tons daily, for a single shift, with correspondingly greater output for continuous running. The sections originally installed are arranged on what is known as the Baum flooding system; but those recently constructed operate in accordance with a method which requires far less water. Coal which cannot be washed with profit, which forms a small percentage of the total quantity mined, is graded by screens placed near the shafts and distributed directly to bins for shipment. There is also a briquetting plant for dust and small particles screened out of the waste from both the dry and wet classifiers.

BYPRODUCT COKE OVENS

In connection with two of the groups of mines, coking plants are maintained. Most of the ovens are of the Coppée waste-heat type, the gases of which are used for firing steam boilers. The remainder are Otto byproduct ovens. The products recovered from the latter plant are raw and prepared tar from which naphthaline, carbolic acid and creosote oils are recovered, sulphuric and ammoniacal acids with their derivatives, solvent naphtha, xylene, toluene, nitric acid, benzol and other light oils.

Connecting the various plants and shafts is an intricate network of industrial railway, on which steam locomotives are at present used. These will probably be superseded within a few years by electric haulage.

CARE OF WORKMEN

Near shafts Nos. 4 and 6, at a place known as Leithe, there is an attractive town established by the company which provides homes for the men convenient to their work. Others live in nearby villages. Including officials, foremen and clerks, there are approximately 5200 employees, nearly three-quarters of whom labor underground. A school is maintained for the children of employees and visiting nurses and medical attendance, dispensary, etc., are provided to take care of illness in the families, the expense of which is borne entirely by the company.

For the use of the men, themselves, at each working shaft, there is a dry and change house, with showers

and other facilities. Separate baths and dressing rooms for the youthful and adult miners are provided. Each change house also includes a first-aid room, fitted up with all the appliances of an emergency operating ward; and there is a separate building equipped with life-saving apparatus. This has facilities for the training and exercise of rescue parties. The men are instructed in means for the resuscitation of miners or others overcome by gas or suffering from electric shock, while simple rules of precaution and first aid are conspicuously posted at the mine entrances and near operating machinery, particularly electrical apparatus and conductors.

In addition to its local benefits the company maintains membership in the General Miners' Association, at Bochum, and pays subscriptions for all classes of employees, including officials, to the three welfare branches of this society, viz: those having charge of cases of temporary disabilities and sickness, pensions and general assistance, and old age or invalidism. The exact differences between these is not readily comprehensible to a stranger; but that their functions are important is shown by the company's annual contribution, which runs between \$90,000 and \$100,000. The company also pays out to the Miners' Trade Union, of which it is a member, \$40,000 to \$45,000 yearly. Just what purpose this union serves I did not learn.

THE SYNDICATES OF PRODUCERS

The annual production of the mines approaches 1,300,000 tons of coal, and the coke pushed aggregates about 380,000 tons. The briquetting plant uses nearly 90,000 tons—a most significant fact.

A large percentage of the output is consumed at the furnaces, mills and shops of the parent company, the name of which in English would be the Rhine Steel Works. These are located at Duisburg-Meiderich. The surplus, as well as the byproducts of the coking plant, are marketed through syndicates. Membership of the company in the Rhenish-Westphalian Coal Syndicate, the Tar Sales Union, the Ammoniac Sales Union, the Benzol Union and other selling organizations enables it to market its coal, coke and byproducts with a certainty and degree of profit which could otherwise hardly be realized.

Americans should find much of practical interest in this syndicate system, which has features of great suggestive value to coal operators, miners, consumers, and legislators. It is encouraged by the government, and the crown-lands collieries directly participate in its operations with the result that there has been brought about a steady, normal demand for materials and labor of all kinds used in mining, large economy in the production, handling, transportation and selling of coal, coke and byproducts, a lowering of prices to fuel and chemical users as compared with what must otherwise have been charged in consequence of the rising scale of wages and cost of material, and the practical insuring of fair returns on money invested.

The syndicate has also done a great deal to eliminate or prevent the antagonism of "the people" towards capital. As a result, the mining corporations and allied interests enjoy a measure of prosperity which enables them to do much in the way of welfare work, to provide means for the conservation of life and property and to establish pensions that encourage long, faithful service on the part of employees. Thus the benefits of the system are generally recognized.

Safety Priming Device

BY WILLIAM W. JONES*

SYNOPSIS—A safe and efficient method of attaching a detonator to a cartridge of permissible powder or dynamite.

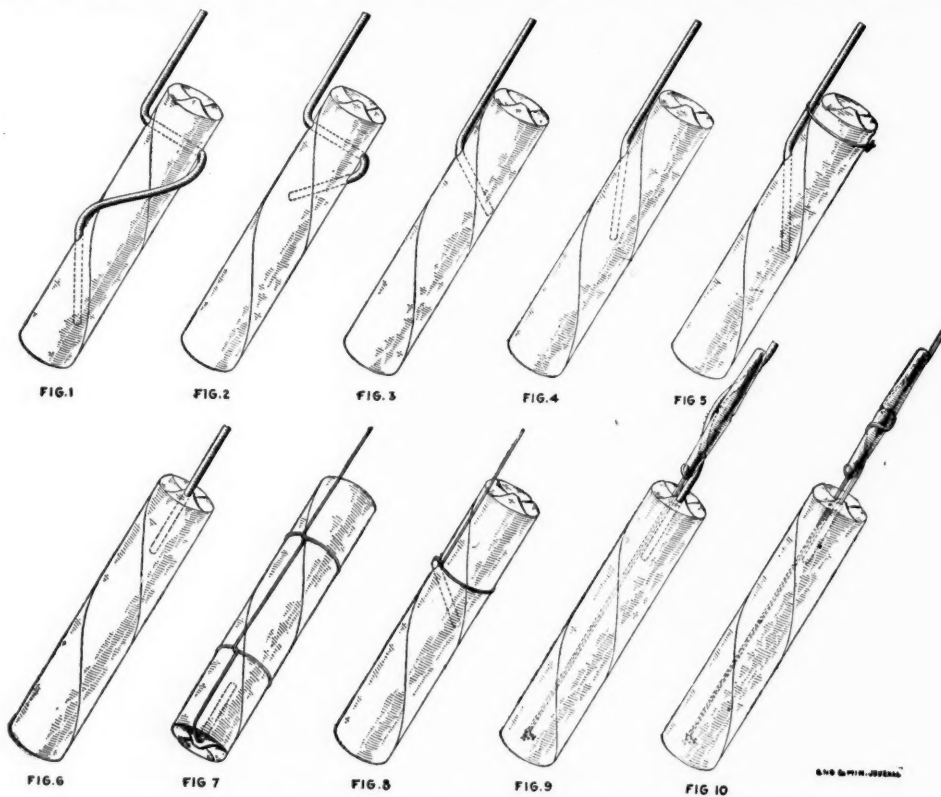
No entirely satisfactory method of constructing a dynamite primer has heretofore been available. Of the various methods of inserting the cap in the cartridge, some of the most unsatisfactory are here illustrated. Figs. 1 and 2 show the fuse laced through the cartridge. The lacing of Fig. 1 is perhaps the more objectionable of the two. The following disadvantages, however, attend either method: (1) The dynamite is likely to ignite as a result of the powder train in the fuse burning through its covering at some point in the cartridge and igniting the latter, which causes an imperfect explosion; (2) the powder train is likely to break where the fuse is bent at an acute angle causing a misfire; (3) the diameter of the primer is so increased that it cannot always be pressed down on the rest of the charge and the air gap may intercept the transmission of the explosion so that the inner part of the charge is not exploded; (4) the cap does not point along the charge and so loses part of its efficiency, and if thrust in too far, it is liable to penetrate the opposite side of the cartridge and be exploded by scraping on the rock.

In Figs. 3 and 4, the cap inserted at an angle does not give the most efficient detonation, and not being tied, it can easily pull out. In Fig. 3, either end may project, and thus cause a premature explosion. The same objection applies to Fig. 5, except that the tying tends to prevent the cap from pulling out. Tying is often neglected, however, as it takes time, and string is not always handy. In Fig. 6, the detonator points in the proper direction, but not being tied, is easily pulled out. In this case, the ends of the paper wrapping can be unfolded and tied around the fuse with a string, but this is often neglected.

In Fig. 7 is shown perhaps the usual way of priming with an electric detonator; it is open, however, to two objections: The business end of the detonator, if the primer be on top as usual, points outward instead of into the bulk of the charge, and the half-hitches are likely to damage the insulation. In Fig. 8, the detonator does not point to the best advantage and is liable to

project on one side. Furthermore, in tightening the half-hitch around the cartridge, the sulphur plug may pull out of the detonator and cause an explosion.

It will be noted that the principal objections to the methods of priming here illustrated are that the cap is not placed to do its work most efficiently, or it is likely to be pulled out, causing a misfire, or it is liable to premature



EIGHT UNSATISFACTORY AND TWO NEW METHODS OF PRIMING

explosion. I have recently invented and patented a device illustrated in Figs. 9 and 10, which will largely do away with these objections and should reduce the number of accidents in the use of explosives. It permits the insertion of the cap in the most efficient manner, while practically eliminating the danger of pulling it out or of breaking the fuse. It consists of an anchoring device to take the pull on the fuse and relieve the cap of tension.

As seen in Fig. 9, the fuse is laced through a small block, probably best made of wood or fiber, the holes being a close fit so as to grip the fuse lightly and placed at such an angle that no sharp bends will be made in the fuse covering. This block is attached by a cord or similar device to the cartridge; a large knot in the end of the cord would provide sufficient anchorage. This would, of course, be inserted when the cartridge was manufactured.

In Fig. 10, the device is represented as used with an electric detonator. The wires in this case are wound around the outside of the block in order to get a sufficient grip. It is evident that in using this device there is little or no danger of the caps pulling loose from the cartridge, and this simple fact makes it possible to place the cap in the safest and most efficient position.

*State mine inspector, Albany, N. Y.

Note—From the "Engineering and Mining Journal."

Typical Coal Trestles

BY WILLIAM WALLACE*

The surface equipment of many mines includes a trestle for bringing the coal to a point where it will dump into the boiler-house bins and also for providing storage against winter use. The accompanying figures show some typical methods of construction employed and also give the profile of one trestle. Squared timber for such trestles is almost universal.

Fig. 1 is a trestle on a 16° curve with a 2.5 per cent. grade. The trestle is 350 ft. long and every third panel is braced with 3x12-in. diagonals to form towers. The rails are laid directly on stringers, which are themselves carried on corbels over the bents and are spliced with steel plates on the sides. The bents are symmetrical and running boards are provided on both sides.

Then tension rod and filling blocks between the stringers are inserted at every bent on the tangents, while on the curve an additional set is used between the bents.

TABLE OF TRESTLE DIMENSIONS FOR VARIOUS HEIGHTS

Bents	Length						Bents	Length					
	Posts			Sill	Posts			Sill					
	Inside	Outside	In.		Inside	Outside			In.				
	Ft.	In.	Ft.	In.	Ft.	In.		Ft.	In.	Ft.	In.	Ft.	In.
1	11	9	12	14	16	0	12	17	10	18	4	18	6
2	12	3	12	7	16	0	13	17	10	18	3	18	6
3	16	2	16	7	18	0	14	17	9	18	2	18	6
4	16	6	16	11	18	0	15	17	8	18	1	18	6
5	16	10	17	3	18	0	16	17	7	18	1	18	6
6	17	5	17	5	18	0	17	17	7	18	1	18	6
7	17	2	17	8	18	3	18	17	6	17	11	18	6
8	17	7	17	10	18	4	19	17	5	17	10	18	6
9	17	5	17	18	18	4	20	17	4	17	10	18	6
10	17	9	18	2	18	6	21	17	4	17	9	18	6
11	17	11	18	4	18	6							

Fig. 3 represents a bent in which the rails are carried on cross-ties, four stringers being used in this case. The trestle is symmetrical with footboards on both sides; all the posts are inclined. The bents are spaced 16 ft., the

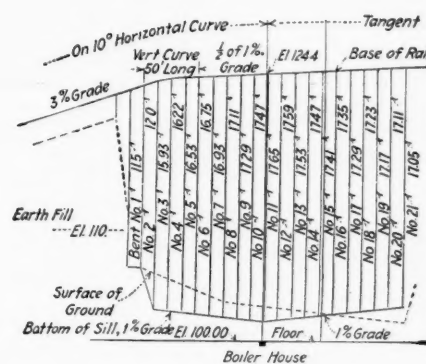
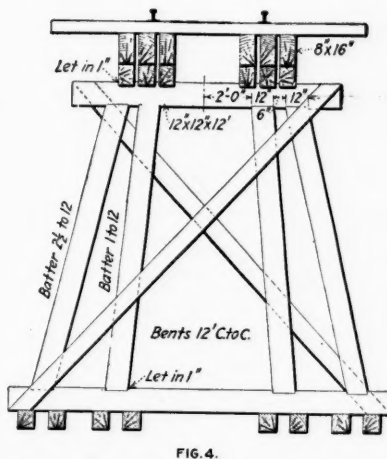
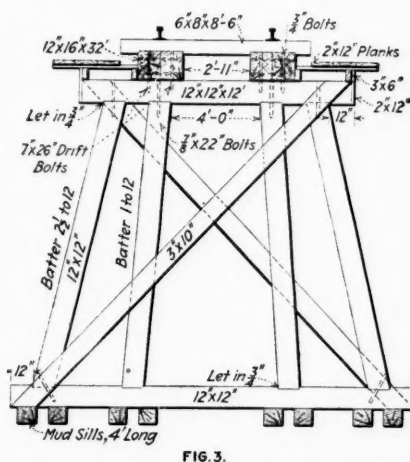
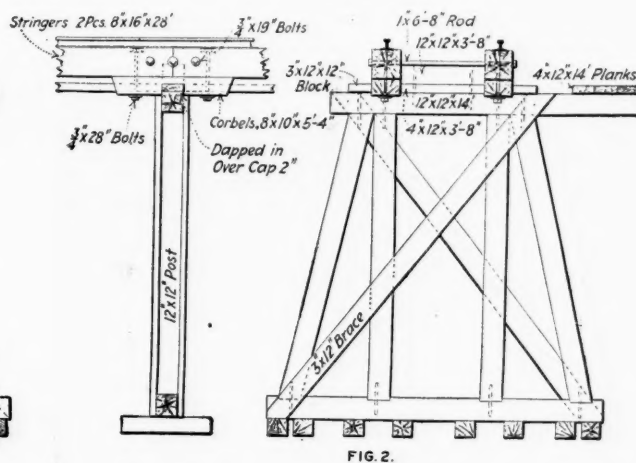
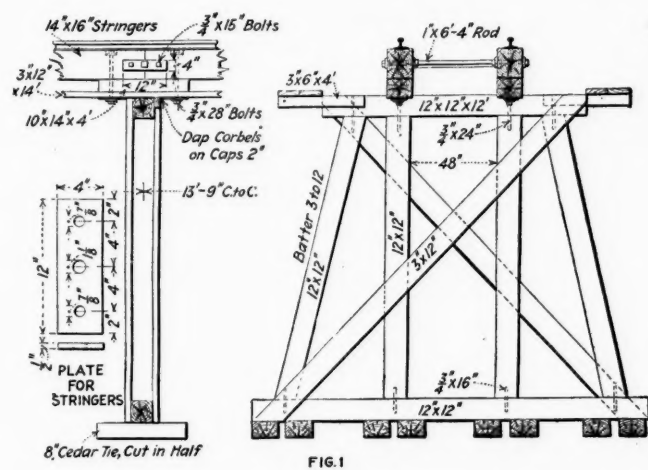


FIG.5. ENG. & MIN. JOURNAL

SOME VARIATIONS IN DESIGN OF COAL TRESTLES FOR MINES

Fig. 2 represents a trestle similar to that of Fig. 1. It is unsymmetrical, however, and the running board is on one side only, carried by an extension of the cap. In this trestle, the grade is 4 per cent. except on one portion, which has a 12° curve, where it is 3 per cent. These grades and curves represent the maximum permissible in good design.

The bents are spaced on 15 ft. 9 in. centers and every third panel is diagonally braced with 3x12-in. planks.

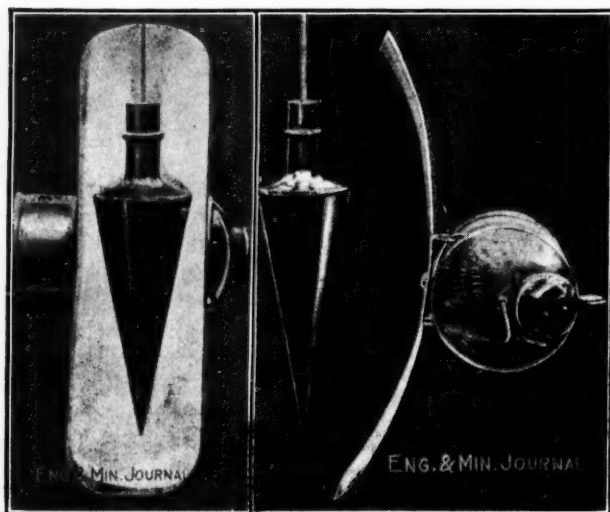
*Mining engineer, New York.

long ties 8 ft.; between the long ties are 25-in. ties spaced 2 ft. In this case also every third panel is diagonally braced. In all three types the safe maximum height is 22 ft.—*The Engineering & Mining Journal*.

At a Warwickshire colliery an accident was caused by a fracture of one of the guide ropes, and the breaking open of the socket connecting the winding ropes to the cage chains. The cage with its load fell to the shaft bottom, three lives being lost and three others injured. The accident emphasizes the necessity of making a thorough inspection of wire-rope guides.

Surveying Reflector for Acetylene Lamp

The time-honored method of giving a sight for a transit underground, says *The Engineering and Mining Journal*, has been to use a piece of tracing cloth held between the plumb-bob cord and a light. With the growing use of the acetylene lamp for surveying, this method is not wholly satisfactory. The hot, jet flame of the lamp, unless closely watched, is extremely destructive of tracing cloth. One method of avoiding the difficulty is to use a hemispherical reflector with its surface somewhat dulled. A skillful helper can so hold a lamp thus equipped as to conceal the flame behind the bob while the top part of the reflector forms a white background for the head of the bob and the string. It is difficult, however, to keep the reflector clean of soot and rust on the one hand and not too dazzlingly brilliant on the other. Obviously, a device designed for the purpose of giving sights would be more satisfactory, and such a device,



REFLECTOR FOR ACETYLENE LAMP

herewith illustrated, is now offered by the John Simmons Co.

It is constructed of sheet iron 2 in. wide and $7\frac{1}{2}$ in. long, bent to an elliptical curve so that all parts will be well illuminated. It is painted with a white enamel and has a hole in the center through which the lamp burner projects. A small piece riveted to the back consists of a nipple, to slip over and grip the lamp burner, and two eyes, to which is attached a strap embracing the lamp and holding the reflector on. As seen, the reflector has its long dimension horizontal when the lamp is upright. This permits it to be worn in the cap without danger of its striking the roof. In use, the lamp is tipped on its side and the flame being concealed by the bob so as to eliminate all glare, the reflector then forms a white strip, showing the top and bottom of the bob and an inch or so of cord. The lamp in this horizontal position will burn long enough to give a sight. If desired, the reflector can be easily detached and carried in the pocket.

Not only is this device quicker and neater than the tracing-cloth method, but it also gives a clearer sight and can be manipulated with one hand. The only precautions necessary are to hold the reflector plumb and to keep the lamp flame concealed.

District No. 5 Meets

On Feb. 17 the biennial convention of the United Mine Workers of America met in the Labor Temple at Pittsburgh. President Van Bittner presided, and President James R. Maurer, of the American Federation of Labor, was present. Mr. Van Bittner stated that 5000 new members had been added to the union in that district, largely as the result of successful organization in Mercer and Butler Counties and in the Allegheny Valley fields. He urged that safety lamps be furnished without charge by the company wherever they are used, and he strongly condemned the laws which put the burden of safety on the mine foreman instead of on the operator. The meeting adjourned without action, pending the conclusion of the joint agreement in Philadelphia.

The Southern Appalachian Coal Operators' Association

Coal operators from practically every company in east Tennessee and southeastern Kentucky were represented at the annual meeting of the Southern Appalachian Coal Operators' Association held Feb. 10 in Knoxville, Tenn. The session was most enthusiastic.

Preliminary to the meeting at the Hotel Atkin, a meeting of the executive board was held in the rooms of the association in the Holston National bank building at 1.30 p.m., when the reports of the president, E. C. Mahan, and the secretary, J. E. McCoy, were made.

President Mahan discussed the rate controversy from points in Tennessee, Kentucky, West Virginia and Virginia to the south and east. He said the Interstate Commerce Commission had announced its intention to investigate coal-freight rates from these points. The secretary showed that practically all the operating companies in the district were members, the number having increased during the past year from 66 to 80.

The membership meeting at 4 p.m. was also held at the Atkin hotel. The following officers were elected: President, E. C. Mahan, of Knoxville, Tenn.; vice-presidents, J. L. Boyd, of Knoxville, Tenn.; C. S. McManus, of Middlesboro, Ky.; Major E. C. Camp, of Knoxville, Tenn.; executive board, Colonel James R. Wooldridge, of Wooldridge, Tenn.; L. I. Coleman, of Knoxville; T. I. Stephenson, of Knoxville; Alex. Bonneyman, of Knoxville; N. B. Perkins, of Knoxville; L. W. McComb, of Middlesboro; J. H. Keeney, of Bryson, Tenn.; H. L. Cory, of Chattanooga; executive board-at-large, A. H. Wood, of Petros; W. C. Tucker, of Benham, Ky.; H. S. Pless, of Knoxville. The secretary and treasurer will be appointed by the executive board later.

A banquet was served at 6.30 p.m., Col. J. R. Wooldridge acting as toastmaster. Among the speakers were E. C. Mahan, W. L. Moss, H. S. Pless, A. H. Woods, C. W. Kehr, J. E. Patton, B. A. Morton and J. B. Williams. J. B. Williams opposed the use of convict labor in mines. H. S. Pless attacked the semi-monthly pay law which applies solely to companies running commissary stores.

Coal Rates in the Pacific Northwest

Coal dealers in Seattle have taken up with Northern Pacific officials the matter of having rates on coal from the Carbonado and Roslyn districts, Washington, reduced so that it will be possible to coal steamers here as cheaply as on Puget Sound, which is not now possible owing to the difference in the freight rate charged from the mines to the bunkers.

The present rate from Carbonado to Seattle is 65c. per long ton, while from Carbonado to Portland it is \$1.75. The rate from Roslyn to Seattle is \$1.50, and from Roslyn to Portland, \$2.25. With a 75c. reduction it would be possible to overcome the handicap, for it costs the average freight steamer from \$400 to \$500 a day to proceed from here to the Sound to bunker. The average quantity of coal taken by these steamers runs from 800 to 1300 tons.

It is a matter that will have to be solved sooner or later for the port is investigating every source of fuel supply, and unless the Northern Pacific finds it advantageous to reduce the rate, the mines in the Washington districts will be shut out of Portland field.

Editorials

The Wage Question

We have already called attention to the fact that in the last two years, the mine worker's dollar has received an increased power of purchase. Let it be clearly understood, however, that the increment has not been large, probably about 2.5 per cent. It tends, however, to increase as the tariff reductions and the increased industrial efficiency operate to cause lower prices.

The general tendency of the two-year period has been to keep wages throughout the country at an even level, consequently that principal cause for increased cost of living has not been operative. True, the railroad men have received an increase in wages but the Interstate Commerce Commission, wisely or unwisely, has, up to the present date, prevented an increase in freight rates resulting therefrom. Consequently, this new impost has not laid any burden on the consumer. The mine worker has been in a somewhat fortunate position for he is in an industry which has received one of the most recent wage increases. His fellow workers have paid him an increase and he is not paying them back.

It remains for us to discover whether dollars, regardless of their purchasing value, come more easily to the mine worker now than they did immediately after the last agreement. For the most part they do not. There has, however, been an increase in the use of machinery. This has enabled the additional machine runners to make more money than they could make as pick miners. But the principal advantage has arisen from the use of improved coal cutters and better operating conditions. These have made possible large increases in output. The new machines cut in some cases 100 per cent. more than the old and operate with fewer breakdowns.

The use of machinery in the forge shops has resulted in the supplying of the machine runner with better shaped coal picks and these are also less frequently burned in the handling. The more frequent employment and greater skill of machine mechanics have also helped to increase the earnings of machine runners.

The change to modern machine types would be more marked had the scale been in a greater degree made flexible to suit the abilities of the newer machinery. The operator has gained little advantage by scrapping his older types and buying new, though when he does buy he always purchases the newer models as their greater capacity usually exceeds their increased cost. So the development in the efficiency of machine runners has been materially hindered though it cannot be denied that their earnings as a class have largely increased.

Pick miners have received some advantages from the fact that they less often have to undercut rooms and their work is more and more restricted to pillars and even parts of pillars where the pressure and loose ends enable them to increase their output with reduced labor. Probably this advantage is not unbalanced where the payment is for lump coal only, because the pillar coal is usually in a broken condition.

We do not wish to add unduly to the list of those mine workers who have received benefit from the increased productivity of their labors by reason of bettered mine conditions for fear our imagination might be more admired than our judgment. Certain changes there are for the better, especially where men have been obliged in the past to push out their cars from the mine face to the roadway and where gathering is, now, done by reel or crab locomotives or where steel rails with ties of the same material have replaced less desirable forms of road equipment.

On the whole, the loaders have shown but little increased productivity and their wages have always increased almost in direct ratio to their contract scales. Of course, day-men are also limited entirely by their per diem wage and their gain in two years since the last scale was signed has been only that due to the slight decline in the cost of living.

In short, all mine workers have advanced their financial position at least $2\frac{1}{2}$ per cent. and some, such as the machine runners, pick miners and some few loaders, have made further progress of varying degree.

✱

The Philadelphia Conference

When the operators met the miners at Philadelphia, both thought they had the good will of the public. The miners were confident of approval, because they had made their demands less radical than had been feared and had promised not to strike until persuaded that they could obtain their demands in no other way. The operators, on the other hand, felt they had public approbation because they came with no suggestions of a reduction and with a readiness to discuss the scale proposed even if they felt that in the end that all demands of the union would have to be refused, and also regarded the offer of the miners not to strike as an attempt to create favorable public sentiment, while secretly preparing to place that public in a tight place.

But to their surprise they were assailed as law breakers and threatened with the Sherman Anti-Trust Law. If the West Virginia operators want the Bartlett Bill passed, thus removing the last vestige of control of labor and legalizing the most open subsidizing of the labor revolt in that state, let them oppose the making of agreements, such as the operators of the central competitive district now propose. This action will force the Bartlett Bill, despite all its faults, through both House and Senate, with the good will of every miner and operator in the contracting states.

If, however, the West Virginia operators object only to the check-off, which provides the funds by which revolts of labor can be effected in other states and countries, then their declaration that they will apply the Sherman law is easily seen to be not so unreasonable.

Difficult as may be the position of the unionized states with West Virginia continually encroaching on their mar-

kets by lower-wage scales, longer hours, better mileage freight rates and less restrictive mining laws, they cannot rightly aid the miners to raise a fund to bring other operators to time. They can only justify such an action by declaring that the end justifies the means. The precedent once established, one operator might use a similar method of ruining another, whose business was conducted on even a more liberal basis than his own. In fact the funds are even now being used on Vancouver Island for this precise purpose.

What a folly it is to aid the Bartlett Bill to passage. That proposed enactment can only be justified by the assumption that in conducting labor disputes, there is no risk that men will be as greedy and dishonorable as they often are in matters of commerce. Experience by no means warrants such a conclusion.

We would suggest to the West Virginia operators that they would do well to consider carefully before making attacks on the coal owners in other states. Though they have done a great service to the state in which they have opened their mines, they do not have popular approval, as they themselves will regretfully admit. They will not do well to endeavor to extend their markets further to the disadvantage of those operating concerns which pay more liberal wages and afford more favorable working and living conditions.

If they would show a disposition to raise wages equally with operators in other states, not in percentage, but in actual increment, those mine owners not threatened by unfair competition would perhaps grudgingly blot out the past and concede West Virginia all that she has gained.

But if the state by a unanimity more strikingly in violation of the Sherman law than that of the joint convention in Philadelphia uses that statute to further advance its ends, there is little knowing what legislative powers may be invoked. Laws could be passed, not out of accord with public morals or the popular conscience which would put West Virginia back where it stood at the beginning of the century.

A common mileage rate throughout the East, uniform federal mining laws, laws giving labor such rights of combination as will afford funds to make the nonunionism of any body of workmen impossible, are all immediate possibilities. We cannot say what revision of the constitution might not be invoked were an obstinate adherence to the letter of the present document to reveal clearly many of its imperfections.

Let the sleeping dogs lie. West Virginia may be angry, but why evoke such an unequal combat?

The Anthracite Conciliation Board

Approximately 100 cases have been brought before the Anthracite Conciliation Board since the last wage agreement was signed on May 20, 1912. Eighty per cent. of these disputes have already been settled, compromised or withdrawn. In 11 cases, when the board was equally divided in its opinion, former Commissioner of Labor Chas. P. Neill was called in as umpire. The mine workers were sustained five times, the operators five times and one case was compromised.

Probably the most important decision of the board was that commending the discharge of miners in the employ

of the G. D. Markle Co. These men were members of the United Mine Workers of America and claimed the right to exclude nonunion miners from the collieries, in violation of that clause in their agreement which provides for nondiscrimination against union or nonunion men. Before this decision was rendered, the entire anthracite industry was in a turmoil, due to the many button strikes which were called for the purpose of forcing all mine workers into the union.

About 94 per cent. of the grievances presented to the Conciliation Board come from the miners.

The above record is one that speaks well for the efficiency and value of such a board in the settlement of labor disputes in the coal-mining industry. It does appear that much trouble might be avoided in many bituminous districts, if a similar comprehensive plan of arbitration could be adopted.

Store Coal

The old adage that one should "beware of the Greeks and the gifts they bring" is not less true, because Virgil, its originator, is now dead. When the miners promise no strike or suspension till they get ready to strike or to suspend, do not imagine that they will fail to bring that most effective of artillery into action just as soon as the occasion best serves.

They have not promised that they will bring no big guns into the field. All they have said is that they will mask their batteries until the enemy, the operators and the public, have been drawn into a compromising position. After all, theirs is good generalship rather than a devoted interest in the peoples' welfare.

However, let the public beware. A stock of coal on hand will do no manufacturer any harm. It will be a good insurance against scarcity and if enough people secure such a protection, the miners may fear to try conclusions.

Of course, the New Yorkers say, we burn anthracite, and peace is assured in the hard-coal district. But let them never forget that anthracite will soon be hard to obtain when it has, with the coal of the nonunion states, to supply the needs of the whole country.

The Little Things

The difference between success and failure in mine management is mostly a matter of attention to details. It is the saving of fractions of a cent here and there in production cost per ton that reduces mining charges to a point that spells profit.

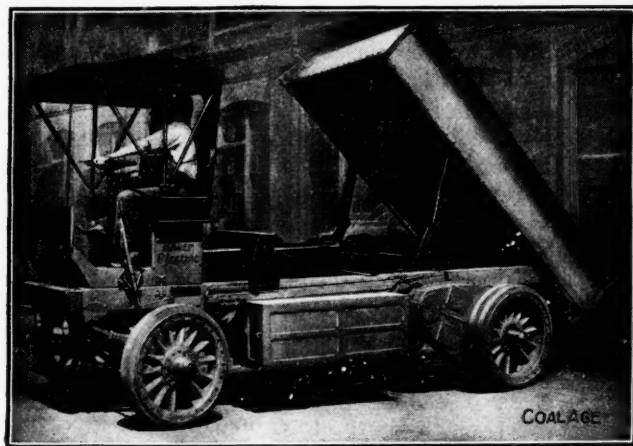
One mine recently underwent a change in management, and the new boss, by giving close attention to his plant during the first year, reduced slightly the totals on six items of cost, which aggregate saving figured out at nearly 2c. per ton. This doesn't seem much at first glance, but the mine in question produced 312,000 tons during the year, so that the saving was more than \$6240, which amount is a sum of considerable magnitude to many coal companies today.

We are only too prone to overlook the pennies in our search for dollars. Any man who can improve the science of agriculture so as to add a single kernel to each ear of corn may effect a five-million-bushel crop increase in America alone.

A New 4-Ton Self-Dumping Coal Truck

The Baker Motor Vehicle Co., of Cleveland, have just announced a new 4-ton dumping body on their standard chassis. This body is made of sheet steel, reinforced with angle iron and is well riveted together. The floor is made of channel steel riveted together, with a smooth steel plate on top for a floor. The tail gate is locked and unlocked by a lever at the side of the driver's seat.

The body can be tipped to an angle of 45 deg. The tipping being done by two arms, one on each side of the body, fastened to a large steel crankshaft, which revolves in one direction only. Two-thirds of the revolution to tip and



SELF-DUMPING ELECTRIC COAL WAGON

one-third to lower. This allows the body to come down to its position on the chassis frame in half the time required to raise it for dumping. The body may be raised and lowered to its regular position in 50 seconds.

The dumping is done by either a hand crank or an auxiliary motor mounted under the seat and driving through a shaft and worm 8 spur-gear reduction on the crankshaft. This shaft runs in oil contained in a dust-proof housing.

The sizes of the standard bodies for handling ordinary material are as follows:

	Coke		Coal		Sand	
Length.....	11 ft.	14 ft.	10 ft.	14 ft.	10 ft.	14 ft.
Width.....	4 ft.	6 ft.	4 ft.	4 ft. 6 in.	4 ft.	1 ft. 3 in.
Height.....	3 ft.	3 ft.	18 in.	2 ft.	1 ft.	plus 3 in.

The Wage Discussions at Philadelphia

We have little to add to last week's account of the labor situation. The meeting of the joint convention at the Bellevue-Stratford Hotel, Philadelphia, Penn., still continues, with the miners sure that they never met 32 more stubborn men, and the operators equally positive that their opponents are beyond the reach of reason. It looks as if nothing will be effected, not even the formation of an arbitration and conciliation board. By refusing this, the miners have shown themselves out of sympathy with modern sentiment.

THE CHECK-OFF DEMANDED

Facing prosecution, we would have supposed the miners would have assented readily to the abolition of the

check-off system. It is probable, however, they look for legislation to purge of offense that provision of the proposed agreement. Meantime, they insist that the operators, not only break the law with them, but agree to break it for the duration of another contract, providing the law is not changed.

They show by this little respect for the law. As a pledge of their intention to violate it, the president, John P. White, of the United Mine Workers of America, invited the members of the Board of Conciliation of the anthracite region to meet and discuss a modification of the contract existing between anthracite operators and miners, though this agreement does not expire till 1916. The specific change he desired was one which would extend to the anthracite region that check-off which the bituminous operators were rejecting because of its illegality.

John P. White had the effrontery to declare that the men were breaking their contract right and left, and that this condition could best be stopped by modifying the contract. As the miners do not break the agreement to enforce the check-off, but in order to promote 100-per-cent. unions, one cannot understand the logic of Mr. White's suggestion. It is neither reasonable, nor is it fair. The miners will resent working with those whom they choose to call "scabs," and the check-off will simply give them more money with which to make the resentment effective. The union men, however, have this argument in favor of the check-off. If the operators will only require the miners to sign the check-off book before employment, there will always be 100 per cent. unions. Thus the operating companies will serve as recruiting sergeants as well as collectors for the union. No workmen will then escape the draft of the United Mine Workers of America.

WILL THE ANTHRACITE REGION STRIKE?

Needless to say, the suggestion that the agreement be modified was regarded as a threat to strike as soon as the bituminous mines suspend. It is said that Mr. White denies he has any such intention, and probably with the small fund he now has in hand, he would not wish to involve the whole mining industry in a common strike, with public opinion doubtless most unfavorable.

However, the meeting at the offices of the Lehigh Coal & Navigation Co. to discuss this matter is well worthy of note, for John P. White is not so much leading as being led, and if the anthracite miners decide to tear up their agreement and put it in the fire, neither he nor any of his followers can stop them.

SAFETY PROVISIONS

Secretary F. K. Lane asked the joint conference to consider safety measures, and invited the participants to meet in Washington later, if they could not discuss the subject of safety in their present meeting. We can hardly imagine a less desirable time to discuss safety. Wage discussions are always acrimonious and do not prepare the debaters for coöperative action. The chances for re-creation in discussing safety are so many that it should never be introduced when passions are already heated.

On Tuesday, Feb. 23, the subscale committee agreed that they could not reach an understanding and resolved to report to that effect to the larger body in the morning.

Discussion By Readers

The Mine-Run Problem

Letter No. 2—Referring to the second article, "Analysis of the Ohio Mining Commission's Report," would like to know why some plan similar to the following could not be adopted:

Paying on a run-of-mine basis figured on the percentage of lump and slack for the previous year, with a sliding scale of wages, monthly, quarterly or semi-annually. The price per ton to advance as percentage of slack decreases and *vice versa*. It seems as though this would give the miners what they wanted without at the same time holding out inducements likely to cause careless shooting.

A. N. YOUNG.

Masontown, Penn.

Collapsible Stoppings

Letter No. 13—Referring to the matter of the general custom of building entry stoppings in the mines of the Northwest, especially those mentioned in Letter No. 12, COAL AGE, Jan. 17, p. 136, it is only fair to state that the practice here varies according to the mining conditions and the financial condition of the operator. The best practice, where the conditions will allow, is to build concrete stoppings between all the main-slope headings and on all shaft bottoms and to build likewise concrete overcasts.

Where the roof or floor is too tender to stand, or the ground tends to heave or squeeze, the stoppings are generally built of logs, from 18 in. to 3 ft. long and from 8 to 16 in. in diameter, laid up flatwise, in the crosscut, in a mixture of sand, clay or concrete. This stopping makes a very tight and permanent stopping, in heaving ground. This same practice is used on long entries that must last for 8 or 10 years.

On entries where the life of the entry will be short, the common double-board stopping is used, made out of 1-in. fir lumber, 8 to 12 in. wide, nailed on a framework and doubled. Sometimes these two partitions are set 6 or 8 in. apart and rammed tight with clay, but usually they are nailed together and calked around the edges with canvas or brattice cloth.

In rooms or chutes where the work will last only six months or a year, in some cases, the double-board stopping is used, and in others the common brattice cloth is tacked up. Where the finances of the company will not allow the expenses of concrete stoppings and concrete overcasts, and where the logs seem too expensive to lay up, the common double-board stopping is used throughout the mine, and even on the main air courses, while the brattice-cloth stopping is used in chutes and breastworks.

I have never yet been able to discover that the stoppings had any effect either to lessen or to make more disastrous a mine explosion. That seems to depend entirely on the available coal dust, which furnishes the fuel for the explosion. I have seen cases where permanent

concrete stoppings and reinforced-concrete overcasts were demolished, and where temporary board and brattice stoppings and doors were blown to pieces; and yet the explosion would travel to the mouth of the mine and would seemingly do as much damage, regardless of the kind of stoppings used. To my mind, the only way to prevent the occurrence of a mine explosion, or lessen the damage done by an explosion once started, is to remove the cause. This, in a great many cases, is too expensive to attempt, considering the coal market; and both mine operators and miners take the risk rather than close the property down.

I believe ventilation in the Washington mines is up to the standard practice of mine ventilation. Concrete is used quite extensively; the stoppings are kept tight; and the air made to circulate through all working places. The law requires weekly measurements at the working face and specifies particularly the outside and inside crosscuts. These measurements are checked by the mine inspector, so that it is necessary to keep the ventilation up to the required standard in order to pass the inspection.

J. F. MENZIES, Mgr.,
Carbon Hill Coal Co.

Carbonado, Wash.

The Purchase of Power

My attention was recently called to the following editorial statement, COAL AGE, Feb. 7, p. 253, in criticism of Mr. Rickard's article, p. 234, of the same issue:

From a business standpoint, what does it matter whether a man pays a certain amount from his own pocket for a power plant, or pays interest, depreciation, insurance and taxes on an equal investment made by someone else?

Your question implies that the price paid for power will equal the total operating cost of the steam plant plus interest, depreciation, etc., on the difference in investment; but this is not necessarily true. In most cases, the cost of purchased power will be found to be considerably less than the fixed charges of a private power plant. However, for the sake of argument, assuming the cost to be equal in both cases, from a business standpoint, it makes a great deal of difference to an operator whether he is obliged to finance an independent power plant or to pay the equivalent fixed charges on an investment made by a power company. It makes just the difference between renting and buying a property; and, in any enterprise, this difference may greatly facilitate or handicap the development of the project. I believe this is the very point intended to be emphasized in the statement of Mr. Rickard that you criticize.

Furthermore, experience in this regard teaches that it is not alone the financially weak concerns to whom this argument appeals. Some of the strongest mining corporations in the country are committed to the purchase of power where it is available, even at an equal cost with that of a private plant. Probably no single argument has had greater weight in favor of purchased power

than to refer to the saving of a large and unnecessary investment. Mere interest is not a sufficient return to justify an unnecessary investment in a power plant. There are few concerns, indeed, who cannot use their capital to a better purpose and profit than in making a purchase that will return merely banking interest, after suitable provision is made for depreciation, insurance and taxes.

Continuing, you say:

Let no coal operator, contemplating the purchase of power, deceive himself, or allow himself to be deluded into the belief that by buying current he escapes an investment in power-generating apparatus. For while it may be true that he is not called upon to immediately pay down a lump sum for a power plant, yet he nevertheless pays all the overhead and operating charges—and usually a plump profit also—on somebody else's investment. These items are about as unavoidable economically as the law of gravitation is physically.

It is true that a power company, in order to serve its customers, must make an investment in power-plant equipment; but it does not follow, by any means, that this investment will be as great as the sum total required for the individual power plants necessary to serve the same customers. This, however, is entirely beside the point at issue. It is quite immaterial to the prospective purchaser of power, what may be the investment of the power company. The one broad question for him to decide is, "All things considered, will it pay me to buy power?" Many mining companies are finding an affirmative answer to the question. In a future issue, I desire to submit to your readers some of the reasons for this decision, together with some data on the results secured by the adoption of purchased power by large and progressive companies.

A. E. GREGORY.

Bluefield, W. Va.

Reversible Coal-Cutting Machines

In a recent issue of COAL AGE, Jan. 31, p. 219, "A Reader" calls attention to the reversibility of the Sullivan "Iron-Clad" machine and advocates the use of a double-pointed bit in connection with this new feature in coal cutters.

I believe I am safe in stating that I operated one of the first of this type of machines, in the Southwest, and failed to see where this feature is of much advantage. However, to one desiring to take advantage of the reversible feature, the changing of the bits would be an objectionable delay.

Theoretically, I may say that a double-pointed bit would be ideal; but practically, I am convinced it would be of no use. Breakage of bits is caused by the use of too highly tempered steel, or by an obstruction in the coal bed too hard to cut. In the first case, both points would be of the same temper and in the second, an obstruction that would break one point of a bit would most certainly break the other point also. In case the bit should remain unbroken, both points would be worn alike and thus destroy the usefulness of the reversed point when desired for cutting. Moreover, the time consumed in sharpening double-pointed bits would materially increase the maintenance cost of the machines.

R. M. KEOGH, Machine Foreman,
St. Louis, Rocky Mountain & Pacific Co.
Sugarite, N. M.

The Certificate Law

Letter No. 21—The discussion of this subject, which has brought forth so many interesting letters, prompts me to express my opinion, in common with the rest.

I notice that the argument has been advanced that a man who has passed the examination in a certain state, and has managed a mine successfully for a given period of time, in that state, is unquestionably qualified to fill the same office and perform the same work in another state. I observe that both the correspondents who favor this argument and those who denounce it as unsafe, unjust, harmful and contrary to the doctrine of state rights have, alike, based their opinions on the "competency of the mine foreman or fireboss."

I beg to take the liberty of drawing the attention of both of these classes of advocates to the significance that attaches to the word "competency." I would ask: What does this term mean? Does it only refer to the ability of a candidate to work out and solve satisfactorily the problems of ventilation and mine gases, and, further, to show his familiarity with the state mining law, as is generally required in every state examination? Or does the term imply a general familiarity with and experience in mining work, and include, besides such personal characteristics as alertness, originality, sobriety and a careful conscientious habit?

In my experience during the past 35 years, as a miner in five separate counties and working for many companies large and small, I have found that conditions differ not only in the character of the mines, but in the assignment of the duties of the mine foreman in charge. The foreman of a small concern must attend to almost everything; he seldom has any adequate or efficient help. He is the clerk, surveyor, overseer and boss above and below ground. He must make all necessary calculations and plans and direct every class of mining work.

On the other hand, the mine foreman of a large company is generally given adequate and efficient help. He superintends only the actual work in the mine, while all calculations, plans, etc., are made by the company's engineer, in the office, who also makes the necessary surveys in the mine. The foreman is furnished with all the needed supplies, and is charged only with the duty of carrying out the instructions of the superintendent or manager. While it is apparent that the foreman in the first instance may be required to use some of the theoretical knowledge that he crams for the examination; in the second instance, he seldom has any opportunity to use such theoretical knowledge in the performance of his daily duties.

Owing to his lack of early education, the miner, with few exceptions, has little or no knowledge of arithmetic and geometry; he does not understand the use of formulas and cannot be expected to remember them, in view of the slight use he has for their application. It is needless to say that no one familiar with the hazards and hardships of mining will contend that the competency of a mine foreman should be gaged by his ability to memorize formulas and his knowledge of the English language, which are generally alike deficient. Instances have been mentioned, however, where men holding first-class certificates have been incapable of taking a safety lamp apart, cleaning it and putting it together again properly; and the correspondent has unhesitatingly condemned such men, saying

that they have secured their certificates through influence or by other corrupt practice.

As a remedy for such incompetency of certificated foremen and firebosses it has been suggested that the life of certificates should be limited, and the holders of certificates should be reexamined every four or five years. While I do not deny that there are men in all professions whose actual work does not seem to merit the possession of a certificate of competency, I cannot believe that these men have all secured their certificates by fraudulent means. There are always, of course, imposters; but the suggestion of periodical examination, on account of these few wrongdoers, appears to me to cast a stigma on men who have passed an honest examination. Such a law would rob the mine foreman and fireboss of what little peace and pleasure, rest and tranquility they now have, and keep them in constant trepidation. These men would be forced to carry books to their work and steal time for study that they should devote to their duties in the mine. I regard the suggestion as unjust and cruel.

Referring to the inability of men to perform work as accurately and quickly in later as in former years, it is well to note that this is no indication that they did not possess such ability previously. Their present inability may be the result of being out of practice; but such a man is not a "fake." We can certainly conclude, however, that

the operator who employs a fake, on the strength of his holding a certificate, is as much to blame as the imposter; and I may add he is, in my opinion, as incapable of holding his position as the man he employs.

While it is human nature to strive for improvement and advancement, and while it is useless to deny the value of study in these days of strong competition, it cannot be denied that the time a busy mine foreman or fireboss can devote to study and reading is limited. His duty to his wife and children demands some attention. After all is said, a man who works hard during the whole day is more inclined to rest and recreation than to study in the evening.

In reference to the national certificate law and the interchange of state certificates, I believe that a man who has qualified himself for service in a certain state and has managed a mine successfully therein is qualified, to the same degree, for service in another state. I believe that if such a law is ever enacted, it will prove a great boon to employers and employees alike. Such a law would tend to broaden the education of mining men by affording a vaster field and more varied practice. Such a law is in force in European countries and the result has not shown an increase in the fatality rate over this country.

JAMES T. WARD.

Scalp Level, Penn.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

SPLITTING THE AIR CURRENT

Early Practice, Coursing the Air—In the early practice of mine ventilation, the method commonly adopted was that known as "coursing the air." In this method the air was conducted throughout the mine in one continuous current, from the intake opening to the point where it was again discharged into the atmosphere.

Single Current Not Adequate—Experience has shown, however, that a single air current is not adapted to the ventilation of a large mine, for many reasons. As a mine is developed and the workings extended, more men are employed and greater quantities of air are required to ventilate the mine and dilute and carry away the gases generated.

Need of Dividing the Air Current—The division of the air into two or more currents provides separate ventilation districts in the mine and brings the ventilation under better control, since the quantity of air can then be proportioned to the requirements in each district.

A larger volume of air can be circulated by the same power, and the velocity of the current is kept low.

The smoke and gases generated in one section of the mine are not carried by the current into another section, but pass directly into the main return airway and are conducted out of the mine.

A local explosion of gas or dust, in one portion of the mine, is not as liable to extend throughout the mine.

Method of Splitting the Air Current—Whenever two or more passages or airways are provided by which the air current can travel in passing through the mine, the air will always divide between them in proportion to their several potential values. Hence, all that is required to split an air current is to provide two or more separate routes for its passage. Each separate current is called an "air split" or simply a "split."

Primary and Secondary Splits—A branch or split off the main air current is called a "primary split." If a primary air split be again divided, the result is a "secondary split." When the air current is equally divided between two or more airways the splits are said to be "equal"; but when each airway passes a different volume of air the splits are "unequal."

Natural Splitting—When all the airways are open to the free passage of the air current through them, the air divides naturally between them, each airway or split taking a quantity of air in proportion to its potential value. In other words, the potential of the airway is an index of the quantity of air that airway will pass, in natural splitting.

Proportionate Splitting—When any other division of the air is desired than the natural division, it is necessary to introduce regulators in one or more of the airways so as to obstruct the flow in those splits that naturally take more than the desired proportion, and thereby increase the quantity passing in the other airways till the desired proportion is reached.

The Coal Age Pocket Book

NATURAL DIVISION OF AIR

In all splitting calculations, it is assumed that the unit pressure (lb. per sq.ft.) is the same at the mouth of each split starting from the same point. Therefore, writing the formula for unit pressure,

$$p = \frac{k l o q^2}{a^3}$$

since p and k are both constant,

$$q \text{ varies as } a \sqrt{\frac{p}{l o}}$$

This expression will be called the "pressure potential of the airway." It may be remarked here that the square of the pressure potential (X_p) is equal to the cube of the power potential (X_u); thus,

$$X_p^2 = X_u^3$$

It is the pressure potential that is always used in splitting calculations, for the reason stated above. The calculation of the quantity of air passing in any one of two or more splits starting from the same point in a mine, is based on the following simple rule:

Rule—The ratio of the quantity of air passing in a single split, to the total quantity for all the splits, is equal to the ratio of the pressure potential of that split, to the sum of the pressure potentials for all the splits.

Calling the quantities passing in the several splits, q_1, q_2, q_3 , etc., and the corresponding split potentials X_1, X_2, X_3 , etc.; the total quantity of air in circulation in all the splits Q , and indicating the sum of the split potentials by ΣX ;

$$Q = q_1 + q_2 + q_3 + \text{etc.}$$

and

$$\Sigma X = X_1 + X_2 + X_3 + \text{etc.}$$

Then, according to the rule given above,

$$\frac{q_1}{Q} = \frac{X_1}{\Sigma X}$$

The work of calculation is much simplified and shortened by using what may be called the "relative potential" values, instead of finding the actual pressure potential for each split. This is only possible in splitting calculations, where the potentials are used as ratios, and the value of the ratio is not changed by the cancellation of any like factors in all the potentials.

Relative Potential Values—Whenever the potential is used as a ratio, as in splitting air currents, the relative values should be used. These are calculated from the lowest relative values for the areas, perimeters and lengths of the several airways or splits. For example, if the areas are 48, 60 and 72 sq.ft., the lowest relative values, canceling the common factor 12, are 4, 5 and 6, respectively. Likewise, instead of the perimeters, 28, 32, 34; use the lowest relative perimeters 14, 16, 17, canceling the common factor 2 from each.

Inquiries of General Interest

Widths of Opening and Pillar

I would like to ask COAL AGE and its readers to give their opinions as to the proper width of rooms and pillars that should be required for the safe working of the following seams of coal:

The coal is a hard, bituminous variety, unaffected by exposure to air. There are two seams; the lower one is 5 ft. 6 in. thick and underlaid by a hard shaley sandstone. Above this and separated from it by 80 ft. of solid strata is another seam of coal. The intervening strata are composed of 30 ft. of hard sandstone and 50 ft. of sandy shale and shaley sandstone, this being divided into two layers of about equal thickness, separated by 3 ft. of shaley sandstone mixed with small streaks of coal. The floor of the upper seam is a hard, sandy shale. It is proposed to work both of these seams at the same time, but no pillars will be drawn in the lower until the upper seam has been worked out and abandoned.

In the work that has been done in the lower seam, no falls have occurred, except that occasional small scales have fallen from the roof, and there has been no disturbance of the bottom. The pillars in the lower seam will probably stand for four or five years without injury. Few props have been used in the lower seam. The coal is undercut with chain machines. The average grade in both seams is 2 per cent.

THOMAS C. MILLER,
Engineer.

Benham, Ky.

Correspondent has omitted to give several important data, on which the solution to this problem will depend. The depth of cover or thickness of strata overlying the upper seam and its general character should be known; also, the thickness and character of the coal in the upper seam should be stated. Assuming, however, that the lower seam lies, say 300 ft. below the surface, and taking the average weight of the superincumbent strata as 160 lb. per cu.ft., the pressure per square foot, due to this weight resting on the lower seam is $300 \times 160 \div 2000 = 24$ tons per sq.ft.

Having found the pressure, due to the weight of the overlying strata, the next step is to decide on the safe width of opening or the width of driving the rooms. This will depend on a number of factors, such as the depth of cover, character of roof, floor and coal, and the thickness and inclination of the seam, together with the length of time the pillars must stand before being drawn. In the present case, also, regard must be had to the safe working of the overlying seam, which will naturally reduce the width of opening in the lower seam, so as to give the lower pillars additional width and strength, since these cannot be drawn until the upper seam has been worked out and abandoned.

In the working of contiguous seams, it is important to drive the rooms in both seams on the same centers, so that the openings and pillars in the upper seam will be vertically over those in the lower seam. For the same

room centers, the width of the rooms should be less and the width of the pillars greater in the lower seam than they are in the upper seam, in order to give a wider base of support to the lower pillars.

In the present case, the roof, coal and floor being hard, there is not the same danger of driving too wide an opening, and, considering the facts mentioned above, we may assume an opening in the lower seam of, say 7 yd., or 21 ft. Then, calling the width of pillars in this seam x , the width of the rooms being 21 ft., the room centers are $21 + x$; and it is evident that the pressure on the pillars when the coal in the rooms has been extracted will be increased in the ratio $x : (21 + x)$.

The next step is to estimate the probable strength of the pillars. The crushing strength of bituminous coal varies from 35 to 45 tons per square foot; and, this coal being hard, it will be safe to assume a crushing strength of, say 40 tons per square foot. The strength of pillars varies directly as the square root of the ratio of the thickness of the seam to the width of the pillar; or, for a crushing strength of 40 lb. per square foot, the thickness of the seam being 5.5 ft. and the width of pillar x , the strength of pillar is

$$40 \sqrt{x \div 5.5} = \text{say } 17 \sqrt{x}$$

But the strength of the pillar must be equal to the load resting on it, and we have, equating these two values,

$$17 \sqrt{x} = \frac{24 (21 + x)}{x}$$

Solving this equation with respect to x , we find $x = 13.2$ ft., which is a minimum width of pillar under the assumed conditions.

If, now, there were no overlying seams for which provision must be made, it would be safe to assume a minimum thickness of pillar of, say 15 ft., in this seam, which would make the room centers $21 + 15 = 36$ ft. In order, however, to give a wide base of support for the pillars of the upper seam, we would suggest driving the rooms on 40-ft. centers, in both seams. If the rooms are then driven 20 ft. wide, with 20-ft. pillars in the lower seam, those in the upper seam can be driven 24 ft. wide with 16-ft. pillars. If the pillars are properly centered, those in the upper seam being vertically over those in the lower seam, this will give a projection of 2 ft. on each side of the pillars in the lower seam beyond those in the upper seam.

There are many factors that influence and modify the width of pillars and openings, and while much value attaches to a theoretical analysis of the question, careful consideration must be had for such features as tend to lessen the strength of the pillars by softening the coal or the underlying stratum, or by producing a grinding action that would crush and weaken the pillars. The existence of gas in the coal or the strata adjacent thereto, or the presence of water will tend to weaken the pillars and must be considered in studying this problem, as also any considerable inclination of the seam. We shall be glad to have readers further discuss this question.

Examination Questions

Miscellaneous Questions

HOISTING PROBLEMS

Ques.—Assuming that the hoisting rope, at a certain shaft, in passing from the winding drum to the head-sheave above the shaft, makes an angle of 50 deg. with the horizontal, and that the total load on the rope, including friction, is 10 tons: (a) Find the load on the head-sheave when hoisting. (b) Assuming that the distance between journals or the length of clear span of the head-sheave axle is 24 in., find the diameter of an axle of mild steel, having a tensile strength of, say 55,000 to 65,000 lb. per sq.in., and a shearing strength of 42,000 to 47,000 lb. per sq.in.

Ans.—(a) Referring to the accompanying figure and regarding the small diagram of forces shown on the right, the line *AB* represents the direction of the pull on the

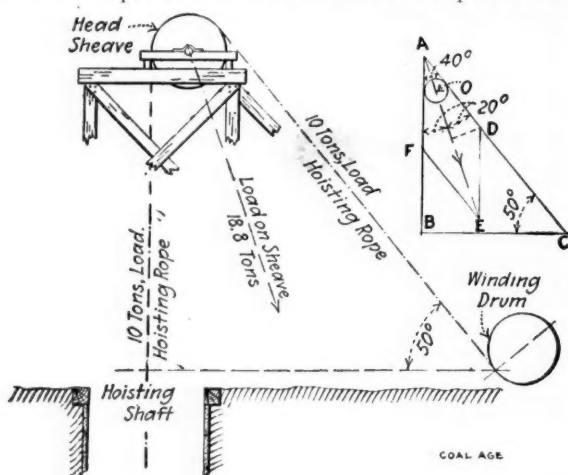


DIAGRAM SHOWING THE DIRECTION AND INTENSITY OF THE LOAD ON HEAD SHEAVE IN HOISTING

vertical rope hanging in the shaft, and *AC* the pull on the rope leading to the drum. The angle *BAC* made by these two branches of the hoisting rope is then $90^\circ - 50^\circ = 40$ deg. The pull of the rope on each side of the sheave is the same and *AF* is equal to *AD* in the parallelogram of forces *ADEF*. The diagonal *AE* bisects the angle between the two ropes, making the angle *EAD* 20 deg. The load on the sheave, for a pull of 10 tons on the rope is then $2 (10 \times \cos 20^\circ) = 2 \times 10 \times 0.9397 =$ say 18.8 tons, or $18.8 \times 2000 = 37,600$ lb. To provide against shock, incident to hoisting, this load should be doubled, giving, say 75,000 lb.

(b) To calculate the required diameter of an axle of mild steel, assume an average tensile strength of, say 60,000 lb. per sq.in., and an average shearing strength of 45,000 lb. per sq.in. Assume a center load of 75,000 lb. on the axle of the sheave; and, to make sufficient allowance for the yielding of the timbers supporting the journals and the lack of rigidity in the structure, estimate on a clear span of, say 36 instead of 24 in. It is necessary to estimate on both the shearing and bending strain to which the shaft is subjected.

Using a factor of safety of 10, the safe shearing strength of the steel is 4500 lb. per sq.in., and estimating on double shear, there being two supports, and calling the required diameter *d*, since the resistance to shear must equal the possible load on the sheave,

$$2 \times 4500 (0.7854 d^2) = 75,000$$

$$d = \sqrt{\frac{75,000}{7068}} = \text{say } 3\frac{1}{4} \text{ in.}$$

for the diameter required to withstand shearing.

Again, in respect to the necessary bending strength of the shaft, using, as before, a factor of safety of 10, the safe tensile strength of the material is 6000 lb. per sq.in. Then, calling the required diameter of the shaft *d*, and assuming an effective span of 36 in., the center load being 75,000 lb., the size of shaft to withstand bending is

$$d = \sqrt[3]{\frac{75,000 \times 36}{0.4 \times 6000}} = \text{say } 10\frac{1}{2} \text{ in.}$$

This diameter, estimated on the resistance of the shaft to bending, being the greater, is the required diameter of the shaft, in this case.

Ques.—Calculate the required diameter of a crucible-steel, 6-strand, 19-wire hoisting rope, for a working load of 8 tons, including the friction of the hoist.

Ans.—This calculation is based on the fact that the breaking load of a 1-in., crucible-steel, 6-strand, 19-wire hoisting rope is 39 tons, and its weight 1.58 lb., or 0.00079 tons per lineal foot. Then, calling the required diameter of the rope *d*, and using a factor of safety of 10 for a shaft 500 ft. deep, the required size of rope is

$$d = \sqrt{\frac{10 \times 8}{39 - 0.00079 (10 \times 500)}} = \text{say } 1\frac{1}{2} \text{ in.}$$

Ques.—Calculate the diameter of round, Norway iron, for a bridle chain on a cage, when the total weight of the cage and loaded car to be hoisted, including the friction of the hoist, is, say 10 tons, or 20,000 lb.

Ans.—In order to provide for shock due to breaking of the rope, it is safe to double the gross load, in estimating the size of chain required, making, in this case, a possible load of 40,000 lb. Using an open-link chain, it is common practice to estimate the required diameter of round iron, by the formula

$$d = \sqrt{\frac{W}{12,000}} = \sqrt{\frac{40,000}{12,000}} = \sqrt{3.333} = 1.8 \text{ in.}$$

Ques.—An engine showed that it developed 60 hp. At the time this card was taken, the engine was hoisting a load of 3 tons, in a shaft 148.5 ft. deep, in 30 sec. What was the efficiency of the engine, neglecting friction?

Ans.—Assuming the actual time of hoisting in this shaft is 30 sec. or $\frac{1}{2}$ min., the average speed of hoisting is $2 \times 148.5 = 297$ or, say 300 ft. per min. The actual work performed or the effective work is, therefore, $3 \times 2000 \times 300 = 1,800,000$ ft.-lb. per min., or 54.54 hp. The indicated horsepower, as shown by the engine card taken at the time of hoisting, being 60 hp., the efficiency of the engine is $54.54 \times 100 \div 60 = 90.9$ per cent.

Coal and Coke News

Washington, D. C.

According to authorized statements made public here within the past day or two. The bill in equity of the Peoples' Coal Co., of Scranton against the enforcement of the new 2½% state anthracite tax by Archibald W. Powell, Auditor General of Pennsylvania and Robert K. Young, State Treasurer, will be argued in the Court of Common Pleas for Dauphin County within a few days. The Peoples' Coal Co. avers that the act imposing the tax is illegal in 8 different ways and as illogical as it is illegal.

The first legal objection to the act is that it is a local and special act, and no notice of its passage or proposed passage was given as should have been done according to Art. 3, Sec. 8, of the constitution of Pennsylvania.

The second legal objection is that the tax—"violates Sec. 1 of Art. 9 of the state constitution which provides that all taxes shall be uniform upon the same class of subjects within the territorial limits of the authority levying the tax." Anthracite coal differs from bituminous, semi-bituminous, and semi-anthracite coal in no wise except in the percentage of fixed carbon which it contains, and the line of demarcation is so slight, and the uses to which it is put so similar as to make any attempt to separate it from other coal as a subject of taxation arbitrary, illogical and illegal. All of these coals are mined within the limits of the State of Pennsylvania which is the authority imposing the tax.

The third legal objection refers to the elementary principle that the purpose of the taxation must pertain to the district taxed, and this objection also covers the illogical features of the distribution of the proceeds. The result of the distribution of one-half the proceeds to the boroughs and townships of the various counties where coal operations are carried on, pro rata according to their populations, as specified in the act, would be that many such municipalities would receive large sums of money from this source, when, as a matter of fact, not a pound of coal of any description is produced within their limits.

It is pointed out that if this act were enforced, a number of municipalities in the County of Lackawanna for instance, would receive amounts two, three, four or five times as great as their municipal expenditures, when these localities do not produce a pound of anthracite or any other kind of coal. Dalton and Waverly Boroughs, Benton, Covington, Greenfield, Jefferson, Newton, Scott and South Abington Townships, of which the above is true, would receive an estimated aggregate of nearly \$20,000. This would result, on the other hand, in only a ridiculously small amount being appropriated to the municipalities producing the coal.

HARRISBURG, PENN.

There will be no "check-off" system in the anthracite region during the life of the present working agreement, which expires Mar. 31, 1916. This was decided finally on Feb. 19 at a conference of the anthracite conciliation board, the representatives of the operators standing firmly against the institution of the check-off system as requested by the miners.

Representatives of the miners asked that it be made plain to the public that the union representatives had sought the meeting of the Conciliation Board with a request for the institution of the check-off in no spirit of demand or defiance, but purely in one of cooperation in an effort to help both themselves and the operators by doing away with recurring small labor troubles, known as "button strikes."

The operators contended that the "check-off" would be a violation of a law of this state which provides that the employer shall pay the full wages due the employee, to him in person and in cash. They further assert that the failure of the union to prevent the numerous sectional, or "button strikes," which have followed the refusal of miners' to join the union ranks, constitutes a violation of the agreement on the part of the miners. They also intimated that a little stricter discipline on the part of the union officials would be enough to abolish such petty disorders.

To this the miners' representatives replied that they had exerted the greatest possible discipline and found themselves unable to entirely do away with the small labor troubles. With the check-off, they claim, they could better control the

men, and could insure steady, uninterrupted service in the mines during the life of the working agreement. They also stated that this had been no ultimatum or demand, and that no serious violation of the working agreement was to be expected as a result of the refusal of the operators to agree to their request.

It is already evident that one of the demands to be made at the expiration of the present agreement will be the check-off. The issue has been included in such demands since the first agreement was signed, but each time it was put aside for other concessions. Affairs have been shaping themselves in such a way that it would not be surprising if the miners' placed more than the usual emphasis upon this feature in the future.

The present agreement stipulates that the operators shall not be compelled to discriminate between union and non-union men in employment, and so has every agreement specified since the beginning, but the union miners' have caused endless trouble, especially during the past few years, by refusing to work with men who do not wear the union insignia. Almost constantly one or more collieries are tied up and serious loss is sustained on both sides. The operators charge the union men with violating the agreement, and the officers of the union reply that the men at individual collieries act impulsively and cannot be controlled. In most instances the trouble is not settled for days and sometimes weeks, and then in a way which leaves the whole problem unsolved.

PENNSYLVANIA

Anthracite

Lykens—On Feb. 17, an explosion of gas occurred in No. 1 Shaft of the Williamstown Colliery and two miners were instantly killed and two others injured. On Feb. 19, five men were seriously injured by a fall of roof in No. 2 shaft of the same colliery, which is operated by the Susquehanna Coal Co.

Plymouth—Because 10 men refused to join the United Mine Workers of America, a strike was called on Feb. 18, by about 1000 men and boys at the Lance No. 11 colliery of the Lehigh & Wilkes-Barre Coal Co. It is regarded as quite unlikely that any hands at other places will join in a sympathy strike, in which event the company may suspend operations indefinitely at the Lance, as the amount of coal required can be had at other mines of the company.

Hazleton—Hazleton residents find it takes almost a week to get a ton of coal, although the town is built above about 100 ft. of the mineral. The big snow falls since Feb. 13, have blocked the streets so effectually that coal dealers cannot make more than three or four deliveries a day.

Shenandoah—A crowded trolley car on the Schuylkill Electric Ry. had a narrow escape from being buried on Feb. 18. The car was on its way to Mahanoy City, when the motorman noticed the track gradually sink. He instantly put on the full current and had just passed over the defective spot when the earth caved in and, with the track fell about 100 ft. to the bottom of the old workings of the Knickerbocker colliery.

Scranton—Falling from the Big Vein, an unknown foreigner, employed as a miner's laborer, dropped a distance of over 300 ft. in the shaft of the Diamond Colliery of the Lackawanna Coal Co. recently. There is water in the shaft to the depth of 62 ft. and although three shifts of men were employed in fishing for the body it was several days before it was recovered.

Bituminous

Mount Pleasant—The latest convenience arranged for the miners at the Standard works of the H. C. Frick Coke Co., is a bath house. This is the only house of its kind in this region and it took some hard work on the part of the superintendent to persuade the men that it was for their own use and was free. In the bath house are 37 baths, 12 wash bowls and a plunge or pool, 8x12 ft. It is heated by steam and lighted by electricity.

Fallowfield—Negotiations are under way for the sale of approximately 500 acres of coal in Washington County, with much of the surface included by Joseph Rider et al to the

Warner-Leonard Coal Co. If the tract is acquired this spring immediate development will be started. The price per acre for the coal and surface it is understood, will be about \$1100.

Connellsville—It has been announced that a reorganization of the Sunshine Coal & Coke Co., is being worked out by the directors to avoid, if possible, the sale of the Cyrilla plant on Feb. 28, by the sheriff. The Cyrilla plant is valued at nearly \$1,000,000 and is one of the seven plants owned by the Sunshine Coal & Coke Co. The Cyrilla plant was seized in execution at the suit of the Monongahela Coal & Coke Co. It consists of 142 ovens. It is said that the temporary embarrassment of the Sunshine company is largely due to the fact that considerable sums due the firm have not been turned over.

Du Bois—Miners' delegates from District No. 2, assembled at Du Bois, Feb. 24, to take up matters of business with reference to the wage agreement to be made with the operators early in the spring.

WEST VIRGINIA

Huntington—In the last week or ten days there has been a noticeable decrease in the coal and coke traffic throughout this section of the state. Since several of the large orders are now filled, many of the mines are working only about half time. Although much coal and coke is being hauled by the roads at present, the shipments are not as heavy as they were some weeks ago.

Wellsburg—If the Supreme Court of West Virginia decides the case involving the coal lands on Buffalo Creek in favor of the local creditors, it will mean the development of a coal tract that will make this one of the leading centers of the state. In several previous cases between local creditors of the company and its New York bond holders the local men have won, and they have every reason to feel confident that the Supreme Court will also be in their favor.

Fayetteville—The New River Co.'s tippie at the Scarbro mine was entirely destroyed by fire recently. Along with the tippie the contents of the engine room and compressor room was also burned. The loss is heavy, believed to be approximately \$50,000. Work at the mine will not be discontinued on account of the fire, arrangements being made to move the coal out through the Wingrove opening.

ALABAMA

Centerville—The Circuit Court of Bibb Co. on Feb. 19, rendered a judgment for the defendant in the cases against many coal companies filed by the State Tax Commission in an effort to assess leases on mineral properties. The juries returned a verdict in favor of the defendants thus holding that the leases, as such, were of no value and reversing the judgments of the State Tax Commission, which had assessed them at large amounts.

Bessemer—The coal mines at Dolomite broke all records for output recently, when No. 1 Mine produced 1800 tons in one day, and No. 2 Mine fell a little short of 1700 tons. On the following pay day when the pay envelopes were distributed, each was accompanied by a good cigar given by the company in honor of the event.

OHIO

Columbus—Mine strikes at Amsterdam, Jefferson County and Salineville, Columbiana County, caused by a misunderstanding of safety regulations of the Ohio State Industrial Commission were quickly ended when J. B. Roan, Ohio safety commissioner of mines, representing the commission, explained the regulations and convinced the miners that there was nothing in them detrimental to their interests. The regulations call for a mutual agreement between the company and the miners, relating to the use of motor and rope haulage in taking men to and from work, and when the operators at both places submitted the agreement to the men, they not understanding it fully, fell into the error of thinking that the operators were trying to "put something over them."

Newark—Because of the failure of the natural gas pressure at Newark during the recent zero weather, there were many hurry calls for coal and dealers in that city did a thriving business. Considerable suffering resulted before coal could be substituted for natural gas.

Coshocton—The 100 miners employed at the mines of the Morgan Run Coal Co., who struck recently have returned to work. All of the difficulties have not yet been settled but they will be adjusted soon.

Zanesville—Inability of two coal cutters, to come to terms with the Jonathan Creek Coal Co., near here has thrown the entire force of 75 miners out of work for a week. The two men quit owing to differences over several matters. At that time their wages were from 20 to 21 cents higher than the

regular scale. They resumed work but when they found their wages had been cut to the regular rates, they again quit. The mine is tied up with no settlement in prospect.

INDIANA

Brazil—While the block coal business has been better this month than in those preceding. The season as a whole has been the dulllest for years and little work in the mines has been done this winter. The weather and industrial conditions are said to be responsible.

Sullivan—The closing of the Mammoth Vein mine of the Monon Coal Co. marks the abandonment of all the mines in the Shelburn field, except the old Shelburn mine, which employs about 50 men. The tracks in the Mammoth are being taken up and the machinery and motors removed.

Newport—Prospectors have taken options on several hundred acres northwest of here and intend drilling for coal in the spring. There is said to be a vein of coal 5 to 6 ft. thick at a depth of something less than 100 ft. as holes have been drilled which resulted in this discovery. For some reason the field has never been developed. Local people have many options and are ready to see what the opportunities are for making this one of the most prosperous mining districts in the middle west.

ILLINOIS

Benton—A "squeeze" at the mine of the Benton Coal Co. recently shut down the property for several days when the books were overloaded with orders.

Sorento—The blacksmith shop and part of the engine house of the Northern Coal & Supply Co.'s mine here was destroyed by fire. The loss was covered by insurance, and the mine was compelled to shut down for a few days.

COLORADO

Trinidad—Although the third week of the Colorado coal strike investigation has begun, the strikers are still presenting their evidence and have given no intimation that they are near the conclusion of their case. The operators have stated that they will ask the committee for several days in which to present evidence, and the legal department of the State Militia is preparing to place many witnesses on the stand to refute the various charges that have been made against the militiamen.

FOREIGN NEWS

Paris, France—The miners of St. Etienne and several of the largest central and southern collieries called a general strike for Feb. 23, as the result of the elimination by the Senate of several clauses of the Underground Workers Pension Bill. Northern miners are, however, opposed to the strike and refused to go out. The government dispatched large reinforcements of troops and gendarmerie to the affected points to prevent disorder.

Santiago, Chile—Statistics have just been published by the Chilean government showing the importations of coal to have been 1,529,258 tons during 1912. Of this amount, 979,019 tons came from the United Kingdom, 404,404 tons came from Australia and 68,875 tons came from the United States. Coke importations totaled 52,569 tons in which business Germany led. Crude petroleum for burning was imported to the amount of 230,848 tons about equally divided between Peru and the United States.

Lima, Peru—Since the overthrow of the Billinghurst administration, it is believed that the bill providing for the nationalization of the coal mines of the republic will not be re-presented to Congress. Many practical business men opposed this measure from the start as they felt that such legislation would retard the development of the coal fields. By opening this resource to private enterprise it is believed that but a short time will elapse before the country is supplying its own needs for fuel and will be able to take advantage of the splendid market opened in the near-by Chilean nitrate fields.

PERSONALS

Gordon L. Cox, Assistant Engineer, of the La Follette Coal Iron & Ry. Co. at La Follette, Tenn., has resigned his position to accept a similar one with the Solvey Process Co. at Paint Creek, W. Va.

Eli T. Conner, a mining engineer whose specialty is coal, announces the removal of his office from the Real Estate Trust Building, to Room 1315, Stephen Girard Building, both in Philadelphia, Penn.

J. A. Grant has resigned the position of engineer of the Sayre Mining & Manufacturing Co., at Birmingham, Ala., to accept the position of assistant engineer of the La Follette Coal, Iron & Ry. Co., at La Follette, Tenn.

Geo. M. Shoemaker, of Pennington Gap, Va., recently superintendent of the Virginia-Lee Coal Co., has accepted the position of superintendent of the Rex No. 1 mine of the La Follette Coal, Iron & Ry. Co., to succeed H. Bevan.

H. C. Slein, general sales manager of the Stromberg-Carlson Telephone Manufacturing Co., maker of the well known Mine-A-Phone, has resigned to become advertising manager of the Yawman & Erbe Co., of Rochester, N. Y. Mr. Slein's connections with the former firm extended over a period of ten years.

A testimonial banquet was given by the officers and employees of the Scranton Coal Co. in the parlors of the Hotel Germyn in Scranton, Feb. 18, in honor of the newly elected general manager, William L. Allen, who succeeds the popular John R. Bryden, retired. Mr. Allen has been for many years the superintendent of the company, and is held in the highest esteem by all his officers and employees, who took this means of showing their regard and pledging their loyal support in every department of the work.

Peter McGinnis, Jr., of Uniontown, Penn., claims to be the champion coal digger of the world. Mr. McGinnis is now 67 years of age. He entered a mine at Wellersburg, Penn., in 1856, when less than nine years old, and has been engaged steadily in digging coal ever since. He still mines from five to six cars daily, or about 200 bu. It is estimated that, during his lifetime, this miner has dug approximately 3,000,000 bu. of coal, for which he has been paid about \$40,000. He expects to work three years more before retiring.

OBITUARY

Captain Joseph B. Williams died at the home of his niece Mrs. Samuel Youtsy, at California, Penn., Feb. 19, at the age of 80 years. Mr. Williams was born at Wood Run and was an extensive coal operator throughout this section of the state for many years, being at one time the manager of the Silver Lake Coal Co. Some years ago, he sold his interest in coal lands and lived a retired life until his death.

John Gilmore, superintendent of the Hughes Creek Coal Co., at Hughestown, W. Va., was found dead Feb. 19, in a field about a half mile from his home. Leaving a Chesapeake & Ohio train at St. Albans, he was seen to cross the river and start for his home about a mile below Sattles. It is the general supposition that, walking down the railroad track, he fell and struck his head, from the concussion of which he became dazed and wandered into the open field, where he died of exposure. Mr. Gilmore was a native of Scotland, coming to this country at an early age.

RECENT COAL AND COKE PATENTS

Coal Chute. V. Ashworth, Paterson, N. J. 1,083,650. Jan. 6, 1914. Filed July 7, 1913. Serial No. 777,719.

Boller. R. G. Fritz, Los Angeles, Calif. 1,083,205. Dec. 30, 1913. Filed Sept. 23, 1912. Serial No. 721,976.

Smoke Consumer. W. Kelly, Memphis, Tenn. 1,083,540. Jan. 6, 1914. Filed Aug. 3, 1912. Serial No. 713,077.

Smoke Consumer. G. Feters, Canton, Ohio. 1,083,075. Dec. 30, 1913. Filed Oct. 5, 1912. Serial No. 724,911.

Coal Conveyor. O. E. Barene, New York, N. Y. 1,082,391. Dec. 23, 1913. Filed May 22, 1913. Serial No. 769,191.

Smoke Consumer. J. O. Richard, Hammond, Ind. 1,083,138. Dec. 30, 1913. Filed Aug. 17, 1912. Serial No. 715,588.

Coaling Station. A. B. B. Harris, Chicago, Ill. 1,082,194. Dec. 23, 1913. Filed Oct. 2, 1912. Serial No. 723,533.

Exhaust Apparatus for Mines. B. Puskas, Windber, Penn. 1,083,758. Jan. 6, 1914. Filed Dec. 28, 1912. Serial No. 739,001.

Water Tube Boller. R. Delaunay, Belleville, France. 1,083,517. Jan. 6, 1914. Filed June 30, 1913. Serial No. 776,660.

Steam Boller Furnace. G. S. Gallagher, New York, N. Y. 1,084,853. Jan. 20, 1914. Filed Aug. 22, 1912. Serial No. 716,356.

Smoke and Heat Protector for Firemen. M. Panian, Eveleth, Minn. 1,084,958. Jan. 20, 1914. Filed Jan. 6, 1911. Serial No. 601,188.

Cutter Head for Mining Machines. J. Tuck, Hawk's Nest, W. Va. 1,084,871. Jan. 20, 1914. Filed May 27, 1912. Serial No. 699,945.

Hanger for Miners' Lamps. L. K. Terry, Cooks, New Mexico. 1,082,779. Dec. 30, 1913. Filed Aug. 7, 1913. Serial No. 783,449.

Igniter for Miners' Lamps. L. D. Vaugh and T. Miller, Grafton, W. Va. 1,084,872. Jan. 20, 1914. Filed Dec. 12, 1911. Serial No. 665,265.

Coal Washer. S. Stepanian, assignor to Jeffrey Mfg. Co., Columbus, Ohio. 1,084,909. Jan. 20, 1914. Filed Sept. 7, 1909. Serial No. 516,331.

Device for Coaling and Watering Locomotives. V. Rainer, Oak Hill, Ohio. 1,084,481. Jan. 13, 1914. Filed Jan. 18, 1913. Serial No. 742,884.

Gas Producer. E. Ragot, Bettaincourt and P. P. Hervotte, Joinville, France. 1,083,507. Jan. 6, 1914. Filed Oct. 15, 1912. Serial No. 725,779.

Heat Diffuser for Boller Flues. L. A. Smallwood, Birmingham, England. 1,082,829. Dec. 30, 1913. Filed June 18, 1910. Serial No. 576,640.

Gas Producer. N. F. Egler, assignor to Blair Engineering Co., Chicago, Ill. 1,083,067. Dec. 30, 1913. Filed Apr. 14, 1910. Serial No. 555,435.

Coke Conveying and Screening Mechanism. T. J. Mitchell, Uniontown, Penn. 1,082,757. Dec. 30, 1913. Filed Apr. 27, 1912. Serial No. 693,664.

Apparatus for Automatically Loading Coal Bins. J. W. Wortham, Decatur, Ala. 1,083,042. Dec. 30, 1913. Filed Aug. 9, 1912. Serial No. 714,223.

Forced Draft Grate. T. Harley and R. G. Long, assignors to U. S. Mechanical Draft Co., Kansas. 1,083,094. Dec. 30, 1913. Filed Apr. 8, 1913. Serial No. 759,687.

CONSTRUCTION NEWS

Des Moines, Iowa.—The Allen & Garcia Co., of Chicago, has entire charge of the complete electrification of the Norwood-White Coal Co.'s mine No. 5 near Des Moines, and is also preparing plans for the electrification of the same firm's mine No. 4.

Hazard, Ky.—The Hazard-Dean Coal Co. is making increases in its coal tonnage and is now shipping 50 cars per day. Another increase is billed for March 1, while two new mines are to be opened. The working force has been increased 100 hands.

Chicago, Ill.—The National Transcontinental Ry. Co. of Canada has just awarded a contract to the Roberts & Schaefer Co. for the building of six large reinforced concrete locomotive coaling plants using the Holman type of coal buckets. The contract price is approximately \$100,000.

Harlan, Ky.—The Martin's Fork Coal Co. has been organized here with \$65,000 capital stock to develop the Smith coal tract of 5000 acres on Martin's Fork near the Wasloto & Black Mountain railroad branch of the Louisville & Nashville, and will start the work of development March 1, it is stated.

Tacoma, Va.—The Douglass-Walker Lumber Co. has bought timber properties aggregating nearly a million dollars near here on Walker's Creek and a six mile branch of the Norfolk & Western R.R. will be constructed onto the property, the construction to start Mar. 1. Lee McChesney, Bristol, Tenn. is manager of the company.

Pikeville, Ky.—The Sharon Coal & Coke Co. recently organized for the purpose of making a million dollar development on Blackberry Creek has been recently re-organized and has established a branch in Huntington, W. Va. An industrial and coal mining city of considerable magnitude is being built by the company. Thousands of men are being employed.

Hillsboro, Ill.—The Allen & Garcia Co., of Chicago, has been appointed engineers in charge of all new work for the Southern Illinois Light & Power Co., at Hillsboro. The work now under way includes the partial electrification of the Peabody mines Nos. 11 and 15, and the Panama mine of the

Shoal Creek Co., together with 50 miles of transmission line, power houses, transformer stations, etc., at an estimated cost of \$200,000.

Mater, Ky.—The Roberta Coal Co. has leased its properties near here to Michigan and Illinois people who will start at once the development of the property on an extensive scale. A first class coal mining plant will be put in at once. The opening of coal mines is to be started by March 1. The construction of a three mile branch line of the L. & N. R.R. will be necessary to complete the developments.

Birmingham, Ala.—Protest against the increased rate on coal from the Birmingham district to Memphis, from \$1.10 to \$1.20, by the Frisco Lines, has been filed by the Empire Coal Co., with the Interstate Commerce Commission. The rate on coal to Memphis from Kentucky and Illinois mines is \$1.10 per ton, and the petition claims that Birmingham is closer to Memphis than these mines, and that the present rate of \$1.10 should stand.

Woodward, Ala.—The Link Belt Co., of Chicago has just closed a contract with the Woodward Iron Co. for the largest and most modern coal washer in the Birmingham district. The new washer will have a capacity of 3000 tons, and will be used in connection with the by-product coke plant of the Woodward Iron Co. at Woodward. The contract calls for construction to begin as soon as possible and to be complete within six months. The cost of the washer will be approximately \$100,000.

NEW INCORPORATIONS

Connellsville, Penn.—The Byrne Coal & Coke Co. has filed notice in Harrisburg of a debt of \$50,000 assumed by the corporation.

Jackshoro, Tenn.—The Fresno Coal Co. has increased its capital stock from \$5000 to \$10,000. The incorporators are, J. R. Barnes, H. B. Bonney, C. F. Hodges, W. L. Lawton and Robert Habbler, Jr.

Shavertown, N. Y.—The firm of Edmond Whittaker, Inc., has been organized for the purpose of mining, milling, agriculture, ship owning, etc. The capital is \$25,000, and the incorporators are, J. D. Roe, Fanny M. and Edmond Whittaker.

Charleston, W. Va.—The Algonquin Coal Co. has been incorporated by J. A. Renahan, E. K. Renahan, George F. Clitter, W. H. Dory and F. W. Pfaff. The capital is \$100,000 and the principal office and place of business will be at Matoka, W. Va.

Parkersburg, W. Va.—The Premium Fuel Co., of Parkersburg, has been organized to operate in Ritchie County. The authorized capital is \$64,000, and the incorporators are, T. E. Graham, Paulus Reps, Charles H. Betts, L. D. Dinsmoor and H. G. Crumley, all of Parkersburg.

Charleston, W. Va.—The Bear Branch Black Coal Co. was recently organized by W. C. Sharp, D. E. Gallagher, L. E. Poteet, J. D. Woodroe and Hugh W. May, as incorporators. The new firm will be under the management of Mr. Sharp, one of the successful coal operators of southern West Virginia, who recently conducted operations on Buffalo Creek of Guyan River.

Gadsden, Ala.—The Little River Land Co. has been incorporated at Gadsden, Ala., with a capital stock of \$25,000. It proposes to develop 2000 acres of coal and other mineral lands near Gadsden. This is a holding company and a new company will probably be organized to operate the property. E. R. LeFevre is president; S. E. Jordon, vice-president; W. G. Bellinger, secretary and treasurer, all of Gadsden.

INDUSTRIAL NEWS

Youngstown, Ohio—The new byproduct coke plant of the Republic Iron & Steel Co., at Lansingville, will be completed and ready for operation about Apr. 1.

Loving, Tex.—A contract has been made between the Sallie-Alice Mining Co., of this place, and H. L. S. Kniffin, of Dallas, whereby the Sallie-Alice company has sold the coal output of its mine for 12 months.

Charleston, W. Va.—The Bell Coal & Mining Co., of Cincinnati, recently purchased 900 acres of land from the Vaughn Estate. This land lies in McDowell County, W. Va., and the mines on the property have a daily output of nearly 400 tons.

Philadelphia, Penn.—Judge Gray, in an opinion filed in the United States Circuit Court of Appeals, recently set aside the verdicts aggregating \$122,000, which were obtained by Meeker & Co. coal dealers, against the Lehigh Valley R.R. Co., and ordered that a new trial be given the suit in the District Court.

Buffalo, N. Y.—The Buffalo By-product Coke Co., organized sometime ago, without its identity or purpose being known, is now found to be an auxiliary of the Lackawanna Steel Co., with \$2,000,000 capital and a large tract of land on which to erect coke ovens for the production of gas for use in the steel plant.

Columbus, Ohio—An announcement has been made by the Ohio Public Utilities Commission to the effect that the alleged discriminatory freight rates in Ohio would be thoroughly investigated during the summer. The report is expected to be ready by Jan. 1, 1915 to be submitted to the Ohio General Assembly.

Washington, D. C.—The fight of David A. Nease for a half interest in 25,000 acres of West Virginia coal land, owned personally or through corporations by Henry G. Davis, R. C. Elkins and the estate of Stephen B. Elkins, was resumed before the Supreme Court recently. The property is said to be worth about \$4,000,000.

Pittsburgh, Penn.—Three of the larger class of Ohio River tow boats, the "Boaz," "Raymond Horner" and the "Cruiser" cleared from the local harbor Feb. 21 with a total of 44 coal boats, carrying 880,000 bushels of Monongahela River coal, consigned to Louisville, Ky., for reshipment to Cairo, Ill., and New Orleans, La.

Connellsville, Penn.—William J. Phelan, an engineer for the H. C. Frick Coke Co., has been awarded a patent for a safety lock on self-jumping mine cages, which it is said renders it impossible for a cage to turn over before it reaches the dumping point. One of these locks will be placed on a cage at Brier Hill for a thorough test.

San Francisco, Calif.—After eight hours deliberation a jury in the U. S. District Court in the case of the Western Fuel Co. officials and employees, early on Feb. 18, found three of the four defendants guilty of defrauding the government out of customs duties on imported coal. These men were F. C. Mills, James D. Smith and E. H. Mayer. Edward J. Smith was acquitted.

Altoona, Penn.—During 1913, according to the report of inspector of mines Joseph Williams, five persons were killed and 57 injured in the mines of the 10th bituminous district, which includes Blair, Cambria and Clearfield Counties, and embraces 58 mines. The number of persons employed underground was 5918, and outside, 857. This showing is somewhat of an improvement over the previous year.

Gillette, Wyo.—The Beaver Hill Coal Co. has recently incorporated with a capital of \$300,000 for the purpose of dealing in real estate, coal properties, developing coal mines, and dealing in coal generally. The term of existence is placed at 50 years from Jan. 13, 1914. The directors for the first year, are Albert A. Walters, Jr., George L. Forsyth and Henry B. Austin. The office of the new company is located at 10 North Main St., Sheridan, Wyo.

Pittsburgh, Penn.—The freight rate of 70c. a ton on coal from the Pittsburgh field to the Mahoning and Shenango valleys was upheld as reasonable by the Interstate Commerce Commission on Feb. 22. This decision was rendered in the case of the Youngstown Sheet & Tube Co., against the Pittsburgh & Lake Erie R.R., on a complaint that the rate was discriminatory and a demand for reparation was made. The commission sustained the railroad.

Mannering, W. Va.—Car No. 7 of the U. S. Bureau of Mines has been located for some weeks at Mora, W. Va., and teams from surrounding mines have been taking daily practice in mine-rescue and first-aid work. The men from the American Coal Cos. Crane Creek mine have been recommended to the Bureau of Mines for first-grade certificates in this work. The successful candidates are R. G. Bailey, Mack Hurst, G. E. Wysor, M. B. Mangus and Peter Drinnan.

Cleveland, Ohio—If navigation is to start by May 1, considerable soft coal will have to be stored for fuelling purposes. The suspension of operations at the mines outside of West Virginia will probably cause a shortage of coal. Coal that has been held in vessels for spring delivery will be available, and there will probably be coal on the upper lake docks, but the shortage will cause the boats to burn some pretty expensive fuel. Navigation generally will be considerably hampered if the suspension should extend for a period of 60 days or more.

Coal Trade Reviews

General Review

Movement much delayed by adverse weather. Stocks somewhat depleted. Conference over the wage scale being watched with interest.

Were it not for the fact that stocks in the hands of the dealers were abnormally heavy, the situation in anthracite would be acute. Even as it is, the demand from the dealer trade is exceedingly heavy, while transportation both water and all-rail is seriously handicapped by the inclement weather. Although the wholesale business has failed to respond to the changed conditions, all sizes are moving off promptly in the retail trade and urgent requests are being received. Jobbers who had expected their present stocks to carry them over until the April discount goes into effect are again being forced into the market. Operations in the mining regions are increased.

The continued heavy snows, low temperatures and high winds have only served to steady the bituminous market up. Stocks are much reduced, as a result of the heavy sales, and little demurrage coal is heard of, while the agencies are looking forward to the spring business with greater confidence. The difficulties in transportation, however, have resulted in additional accumulations at some points, and occasional embargoes against individual shippers are heard of. On contracts for the new year little inquiry has so far developed, but the selling agencies are beginning to work out their plans and are inclined to take an optimistic view of the situation in spite of the current depression.

Stocks in the Pittsburgh district are being rapidly cleaned up as a result of the more seasonable weather conditions, but the change has not yet affected mining operations. The talk of continuing operations, pending a settlement of wage scale, is having a weakening influence in spite of the fact that those best informed generally agree that mining will not be continued. Consumers as a rule, however, do not seem to be worrying about the possibility of a suspension, particularly as the selling agencies from the nonunion districts are closely watching for an opportunity to break into any markets affected. The Ohio trade looks for a heavy buying movement by the middle of March, should the negotiations at Philadelphia be broken off. Even as it is, the colder weather has stimulated the demand, and the February circular is well maintained.

Although there is less coal at hand at Hampton Roads than formerly, there are still few spot sales being negotiated. February shipments over the piers will only about equal the January. With several large steam contracts pending, business in the Southern markets has been slightly stimulated, although operations are still curtailed.

The colder weather has resulted in a gratifying revival in the Middle Western markets. The long continued low temperatures have resulted in stocks being well cleaned up, with the result that the wholesale end of the business is improving and prices showing a strong rising tendency. The negotiations over the new wage scale are also having some effect upon the situation, many large conservative consumers stocking up heavily, preferring not to take any risk over the possibility of a protracted suspension.

EASTERN MARKET

BOSTON

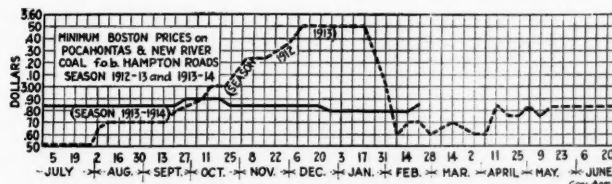
Market firmer because of weather conditions. Increased use of steam colliers eliminating the customary "winter market." Embargo raised at New York and Philadelphia against bituminous. Uncertainty over labor troubles a detriment to contract sales on Pennsylvania grades. Water freights easy. Anthracite taking a spurt.

Bituminous—A week of heavy snow, low temperatures and high winds has had a tendency to make the market a little firmer, although the improvement is not marked. The volume of Pocahontas and New River at Hampton Roads has grown materially less and practically no "distress" coal has been heard from the past week. Prices less than \$2.85 f.o.b. are

not now quoted at all generally, and the agencies are looking forward to spring with rather more confidence. Canvassing for season contracts continues but buyers are still slow about placing their orders.

The situation on contract business is becoming more and more involved with the increased use of steam colliers. The largest consumers in New England are now taking their fuel almost exclusively in that way and with the advantage of regular movement it is probable that we will not again have the kind of winter market that could usually be counted upon, due as it was, in large part, to the slow movement of sailing vessels during the fall and winter months. For inland distribution prices are in much better shape. One of the results is a slightly better demand for coals all-rail.

The embargo against the Pennsylvania coals at some of the tide-water points has now been raised, accumulations at the piers having been much reduced by current sales. The better grades are in more request just now at Philadelphia, for instance, in order to make cargoes in conjunction with anthracite, and the congestion has been relieved in this way to quite an extent.



Labor negotiations are being watched here with close interest. The uncertainty over prices and the outcome of the wage and check-off disputes is a detriment to the sale of the Pennsylvania grades for future delivery. This is the season when New England buyers like to make contracts but outside of the Pocahontas and New River agencies there are few shippers who are now in position to make definite quotations. The Pennsylvania coals last year made considerable inroads on the tonnages normally received here from Hampton Roads and if the business is to be retained the operators ought to be in position soon to name prices.

Water Freights are easy, especially on large tonnages from Hampton Roads to Boston; 70@75c. is the current rate, with little demand. What business offers is easily taken care of by steamers regularly in the trade.

Anthracite—The demand for shipments is now moderately active. Retailers find their stocks so far depleted that they are insistent on prompt shipments. The bad weather besides making the water movement slower has also interfered with dumping at the loading piers. Broken coal is in particularly short supply. Dealers who were hoping to get along until April are now coming into the market for shipments in March, and that is a pronounced change from a fortnight ago.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	\$0.95@1.50	\$1.25@1.60	\$1.67@1.77	
Philadelphia*	2.20@2.75	2.50@2.85	2.92@3.02	
New York*	2.50@3.05	2.80@3.15	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				\$2.85
Boston†				3.73@3.78
Providence†				3.83@3.88

*F.o.b. †On cars.

NEW YORK

Difficulties in transportation the feature in the local situation. Better demand anticipated in March.

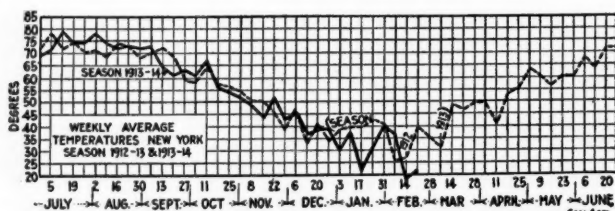
Bituminous—The local market has been affected to some extent by the severe weather conditions during the past two weeks. The ice in the river and harbor has interfered with the movement of boats to the various loading piers, and the frozen condition of the coal in the cars has retarded the loading of such boats as were able to get through the ice. As a result, the accumulation of coal at the piers has increased and some additional embargoes have been placed on individual shippers. On Tuesday the Pennsylvania R.R. placed a general embargo on all shipments of bituminous to South Amboy. The

difficulty in getting boats loaded resulted in a strong demand for loaded boats, and those shippers who had any free coal afloat in the harbor have been able to secure handsome premiums for the coal. Those concerns which have steamship business have had to face particularly trying conditions.

The seasonable weather has had some effect on the minds of sellers, who look for a better demand during the month of March, and some depletion of the large stocks which have accumulated in buyers' hands during the period of mild weather. Apparently very little contracting for next year has been done, and there have been but few inquiries from consumers for quotations on such business.

The result of the meeting between the miners and operators of the Central Pennsylvania field in Philadelphia on Mar. 3 is awaited with interest, and the immediate future of the market depends largely upon the action taken at that meeting.

Demurrage coal may be bought at a sacrifice. The nominal prices for the different grades we quote as follows: West Virginia steam, \$2.50@2.60; fair grades Pennsylvania, \$2.60@2.70; good grades of Pennsylvania, \$2.75@2.80; best Miller Pennsylvania, \$3.10@3.15; George's Creek, \$3.15@3.25.



Anthracite—The transportation of coal in the harbor is still in a most demoralized condition. The recent storm made deliveries almost impossible and there is now so much floating ice in the harbor that it is almost impossible to get the tows through. Light boats have been scarce during the past week. The railroads are making very slow deliveries to tide and the extreme cold weather is seriously handicapping the discharging into the boats.

The demand on the dealers has been extremely heavy but they are unable to make deliveries up to requirements. In some sections trucks are going out with a half ton to the load. This slow movement has the effect of holding independent prices down.

There is very little coal at tide, however, and steam sizes are short, No. 2 buckwheat in the better grades more particularly being practically out of the market.

The demand for rail coal, more especially within a radius of 100 miles of New York, has been very heavy and with continued cold weather the market should take care of the production.

The New York market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken.....	\$5.00	\$4.60@5.10	\$5.05	\$4.55@5.05
Egg.....	5.25	5.25@5.35	5.30	5.10@5.30
Stove.....	5.25	5.20@5.35	5.30	5.15@5.30
Chestnut.....	5.50	5.45@5.55	5.55	5.35@5.55
Pea.....	3.50	3.60	3.50	3.30@3.55
Buckwheat.....	2.75	2.75	2.70@3.45	2.35@2.70
Rice.....	2.25	2.25@2.35	1.95@2.20	1.90@2.20
Barley.....	1.75	1.75@1.85	1.70	1.60@1.70

PHILADELPHIA

Anthracite market still continues to improve. Bituminous trade showing no signs of stimulation.

Anthracite—As a result of more seasonable weather conditions, the anthracite situation still continues to show marked improvement, especially from a local standpoint. The fact that the tidewater business has not responded as was expected, has made full mining operations more than the market would stand, and as a result partial suspensions have been effective through the week.

It is understood that many of the dealers in the New England territory, receiving their coal via tidewater, have been carrying exceptionally large stocks, and in the face of unfavorable weather conditions, have not been able to dispose of them up to the present time. While this branch of the business has responded, at the same time, there is evidently no desire on the part of the New England dealers to overstock, and what coal they are taking is required for immediate consumption. The local market is, without doubt, experiencing more brisk business than has been the case during the winter. All sizes are moving off well, and urgent requests for coal are being made on the operators.

Bituminous—Notwithstanding the recent cold snap, the bituminous trade does not appear to have been stimulated to

any extent. Prices still continue low, and the embargo to tidewater points continues. It is understood that there is considerable coal on demurrage, and with the difficulty experienced in securing water transportation, this condition is not likely to clear up for some time.

BALTIMORE

While prices for spot coal have not improved, the market is showing increased activity. Contract season approaching and foreign order trade on healthy basis. Anthracite has an active season-end spurt.

Increased activity is noted in the bituminous coal offices here. With the contract season close at hand all shippers and agents in this city are busy laying their lines of action for the coming year. The outlook is quite good despite the recent flat period and the trade has grown so used to seeing these that there is not now so much insistence on basing contract prices on a poor market situation such as the present.

About the piers here there is also considerable activity. Not only is the coastwise shipment total averaging good just now, but foreign loadings are increasing in number and extent. There is considerable demurrage coal to be noted here from time to time, it is true, but the local trade has been fortunate in having much of this absorbed for bunkering purposes. The result is that this port has remained in much better shape than some other points on the coast.

The situation at the mines does not show much change. Anywhere from two to four days seems about an average in Pennsylvania, West Virginia and Maryland. There is a sufficiency of labor in most cases, but not a few mine localities are wondering what will be the result if a busy spring and early summer occurs.

Talk of a strike westward is not disturbing the trade here. It is undoubtedly causing discussion elsewhere, however, and is looked upon as the primary reason why a big corporation the past week placed orders for 100,000 tons for immediate delivery fuel, part of which was covered from this city.

Hard coal is having a healthy season-end spurt. The deliveries on household account have been heavy by reason of the cold wave.

CENTRAL STATES

PITTSBURGH, PENN.

Cold weather slightly improves demand, but production hardly increased, on account of stocks. Philadelphia conference on wage scale decides for continuous operation but refers details to sub-committee, which is hardly likely to reach agreement. Connellsville coke quiet but slightly firmer in tone. Shipments slightly decreased.

Bituminous—The continuance of cold weather has given a decided impetus to the demand for coal, to some extent from manufacturers, but chiefly from retail dealers for domestic consumption. Stocks are being cleaned up in markets which were rather glutted, and the tendency is to call upon more coal from mines, but thus far there has been no material increase in mining, which remains at little above 50% of the full rated capacity of the district. The market position as a whole has undoubtedly been given a set-back by the decision of the four-state convention at Philadelphia to have continuous operation in case no wage agreement is reached by Apr. 1.

There is no doubt that the trade has been leaning for months upon the prospect of a prolonged suspension. Apparently the operators were not anxious for a suspension, perhaps profiting by observation in the past that a suspension usually strengthened the market only long enough to get the wage scale signed. The points of difference have now been referred to a sub-committee, as expected, the committee being composed of two representatives from each side from each of the four states. It is rather improbable that the sub-committee will reach an agreement and the prospect now is that instead of there being a suspension Apr. 1 there may later be called a strike, which would throw the idleness into the lake shipping season. The Pittsburgh district miners are strong for the mine-run basis of payment, to which shippers of screened coal are much opposed. Prices continue to be shaded in instances, though perhaps not as much as a fortnight ago, and slack is quite strong, usually commanding a premium. Circular prices remain: Slack, 90c.; nut and slack, \$1.05; nut, \$1.25; mine-run, \$1.30; ¾-in., \$1.40; 1¼-in. steam, \$1.50; 1¼-in. domestic, \$1.55, per ton at mine, Pittsburgh district.

Connellsville Coke—The market has continued quiet, but is visibly stronger since the two sales reported a week ago,

made at higher than \$2. It is recognized that special quality was involved in these sales, but they had an influence nevertheless. There is no contract furnace coke of standard grade available at less than \$2, while quite a number of operators are quoting higher prices, or refusing to quote at all. Prompt furnace remains nominally at \$1.90, but probably only on account of limited demand. Foundry coke for prompt shipment is generally quoted at \$2.50 for ordinary grades, and this might be shaded to \$2.40 in some instances, while some operators making favorite brands are asking a minimum of \$2.75 or even more. Contract coke is quotable at about the same range and is not active as it is between contracting seasons.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Feb. 14 at 300,250 tons, a decrease of 4725 tons, shipments being reported at 300,301 tons, a decrease of 3551 tons.

BUFFALO

Still quiet in bituminous. Mining-suspension talk is not stimulating trade. Heavy weather creates some demand. Anthracite very active. Coke a trifle stronger.

Bituminous—There is some improvement in the movement of bituminous, but there is still more unsold coal on track than is consistent with a healthy trade. The consumer is not at all afraid of strikes, for, as a rule, he is well supplied. Besides there are a goodly number of West Virginia salesmen here, watching the situation for a chance of getting a hold on this market through a shortage in the regular supply.

The increased demand for bituminous since the cold weather set in has helped the jobber and salesman. Contracts are taking considerably more than they did formerly, especially where it is used for heating, but this will not last long. Mining is considerably more active than it was and if the country had not been so overloaded with stock at the beginning of the month there would be a good market now. So it appears that a mining suspension of some length is about all that can be depended upon.

Quotations are a little firmer on the basis of \$2.80 for Pittsburgh lump, \$2.70 for three-quarter, \$2.55 for mine-run and \$2.25 (strong) for slack. Allegheny Valley sizes are 15 to 25c. lower, slack being about on a par with Pittsburgh slack.

Coke—Coke is doing a little better, the lower grades being rather scarce. Optimists are seeing it just ready to take an upward turn, but the general trade is not sure of any stir till it is here. Quotations are still on the basis of \$4.50 for best 72-hr. Connellsville foundry.

Anthracite—The demand for leading grades is heavy, sometimes exceeding the ability of the railroads to meet it, especially as all the mining regions are buried deep in snow, with weather cold. This activity is not expected to last long. Small sizes are especially active for steam making, egg and grate not selling so freely.

There is now much less activity in Buffalo Harbor than at any time during the winter. The ice is so heavy that vessels move with the greatest difficulty and there is no surplus coal for loading. There is a little more than 100,000 tons afloat in the harbor at present. If the season proves severe enough to consume the surplus on the upper-lake docks there will be need of more loading into vessels before lake navigation opens, otherwise not.

TOLEDO

Prolonged winter stimulates business. Also a tendency to stock against a suspension. Prices higher.

A better feeling permeates the coal trade here. The improvement is due in large measure to the prolonged winter temperatures. A disposition on the part of the railroads and large factories to buy surpluses now as a guard against possible suspension of the mines, is also imminent. As a result of the increased demand and better movement of stocks most grades sold at an increase of ten cents per ton over that of previous weeks. Although winter has been dilatory, dealers in domestic are busy caring for orders and if the present cold weather continues will in a measure recuperate from the light business of the early winter.

A heavy demand in steam coal characterized the local market this week. One of the largest factories in the territory has negotiated for a storage stock and it is known that the situation is receiving close attention of the local railroads.

Prices at Toledo are:

	Pocahontas	Hocking	Jackson	Pomeroy	Massillon	Pittsburgh	Cambridge
Domestic lump..	\$2.25	\$1.25	\$2.50	\$1.75	\$2.50	\$1.40	\$1.40
Egg.....	2.25	1.25	2.50	1.50	2.50	.....	.....
Nut.....	1.75	0.80	2.00	1.75	2.50	1.35	1.20
1/2 lump.....	.....	0.90	.....	.....	.....	1.20	1.20
Mine-run.....	1.40	1.15	.....	.....	.....	1.10	.....
Slack.....	.....	0.70	.....	.....	.....	.....	.....

COLUMBUS

The coal trade in Ohio showed a better tone during the past week. Increase in the demand for domestic and steam varieties. Some tendency to stock up against a suspension. The price list is better maintained and production in all districts has increased.

Under the influence of more favorable weather, the coal trade in the Buckeye state continues to improve. There is an increased demand for both domestic and steam sizes and the price list, issued Jan. 15, is being pretty generally maintained. There is still some cheap fuel on the market, but this comes from the stocks accumulated during the recent period of depression. The tone of the market shows wonderful improvement.

Domestic business played the most important part in the general improvement. Dealers were compelled to place orders to replenish stocks, although their desire was to clean up rather than to accumulate fuel. There was a fairly good demand for the fancy grades of domestic lump, especially Pocahontas and re-screened varieties. Retailers business has been in small orders generally, as the larger householders have laid in their winter's supply.

The steam trade shows some improvement, but not as great as in domestic lines. There is a little stocking improvement noted, but not as great as was anticipated. Railroads, especially those which do not penetrate coal fields have laid in a large surplus to guard against a suspension. Some of the larger steam users have started to accumulate stocks also. A better movement is expected in March. It is now almost a foregone conclusion that there will be a suspension. The conference at Philadelphia appears to be completely dead-locked and an adjournment will likely be the result.

Operations in the various mining districts of the Buckeye state have increased under the influence of better demand. The Hocking Valley probably shows the most increase and it is estimated that the production in that district is about 75 per cent. of the average. About the same percentage is reported from Pomeroy Bend also. In eastern Ohio the output has advanced to about 60 per cent. In the domestic fields there is a large increase in tonnage.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump....	\$1.50 @ 1.35	.....	\$1.50 @ 1.45	\$1.50 @ 1.35
1/2 inch.....	1.35 @ 1.25	\$1.20 @ 1.15	1.35 @ 1.30	1.35 @ 1.25
Nut.....	1.25 @ 1.20	.....	1.30 @ 1.25	1.25 @ 1.20
Mine-run.....	1.15 @ 1.10	1.10 @ 1.05	1.15 @ 1.10	1.15 @ 1.10
Nut, pea and slack..	0.85 @ 0.80	.....	0.85 @ 0.80	0.85 @ 0.80
Coarse slack.....	0.75 @ 0.70	1.00 @ 0.95	0.75 @ 0.70	0.75 @ 0.70

CLEVELAND

Inclement weather delays deliveries. Preparations for storing in anticipation of labor troubles. Domestic business stimulated by lower temperatures.

Heavy snow and a lower temperature Sunday and Monday kept coal consigned to Cleveland from arriving. Many of the factories did not open Monday morning because of the weather which offset the small receipts. The demand for domestic coal is brisk, but, owing to West Virginia offerings, the market continues on the low plane.

Fairmount coal, which comes to this market on a \$1.15 freight rate, has been offered at prices lower than good slack. Two and a half-inch lump has been offered at 70c. at the mines, which makes the delivered price \$1.85. There is plenty of lump coal offered by districts that usually sell this market, to supply all the demand. Slack brought better prices last week and outside of the domestic lines was the only coal that held its own. No. 8 lump was sold during the week at slack prices and jobbers refused to accept coal on consignment.

While the railroads are sending "out of repair" equipment to the mines to load storage coal and some of the factories are stocked up, the prolonged meeting of miners and operators of the Ohio, Indiana, Illinois and western Pennsylvania fields at Philadelphia has caused many to postpone stocking. Should the conference break off negotiations this week, it is believed the demand for stocking purposes would be considerably heavier. Operators and jobbers look for a rush of orders for stocking near the middle of next month. The low quotations of West Virginia coal and from No. 8 mines do not extend beyond Mar. 15 shipment.

The call for coal for heating plants has been brisk for two weeks. Pocahontas egg size is rather scarce and, though being sold at the same price as lump, several operators report they are long on egg orders and try to change the orders to lump. Hard coal is in just as big demand as Pocahontas. Middle district coals, being of the semi-domestic variety, have not fallen to the low point of No. 8.

Sales were made at the following prices for spot coal in cars:

	No. 8	Middle District	Pocahontas
Lump, 1 1/2 in.....	\$1.90@2.00	\$1.95@2.15	\$3.60@3.65
Lump, 1 in.....	1.90@2.00	1.95@2.00	
Egg.....			3.60@3.65
Mine-run.....	1.85@1.90	1.80@1.85	2.75
Nut.....	1.90@2.00	1.80@1.90	
Slack.....	1.95@2.00	1.80@1.90	

DETROIT

Market improved under the changed weather conditions. Free coal generally cleaned up.

Bituminous—Bituminous orders are the result of the colder weather, and have created a decided change in the local situation. Reports generally indicate a better tone, and both operators and jobbers are more optimistic over the outlook. The heavy drain upon the supplies during the past week has caused a satisfactory volume of business. This is due not only to the more reasonable weather conditions but also to the anticipation of a suspension in mining Apr. 1. Uncertainty over the outlook is causing dealers and manufacturers to stock liberally.

West Virginia and Ohio domestic lump are selling on an average of \$1.50 occasionally touching \$1.60, while Pocahontas lump is in strong demand at about the same figure. An improvement in the manufacturing demand has resulted in an increased demand for slack.

Anthracite—The colder weather has resulted in a decidedly improved demand for anthracite. Stove and chestnut sizes appear to be the leaders, while egg which was a drug on the market a few weeks ago, does not seem so plentiful. With plentiful supplies on hand and more tonnage en route, there is no fear whatever of a general shortage.

Coke—Coke is also improved. Local ovens now working to the full capacity. Prices have advanced within the last week.

HAMPTON ROADS

Conditions at tidewater unchanged. Circular prices still maintained and demand continues light.

Conditions at Hampton Roads remain practically unchanged, although there is perhaps less coal on hand at this time than there has been for some weeks. There have been some few large cargoes to the New England market during the week and a fair movement foreign. Foreign shipments have gone to Canal Zone, Havana, Naples, Genoa, Buenos Ayres, Luderitz Bay and Port Castries.

There have been some few spot sales during the week, but only for small cargoes; it is impossible to ascertain at what figures sales have been made, but indications are that they have been made at regular circular prices. While it was hoped at the beginning of the month that the dumpings for February would run considerably over the January, present indications are that this will not be the case and that they will run close to the January figures.

LOUISVILLE

Several days of severe weather enabled retailers to reduce stocks, but operators and wholesalers have not benefited, as few dealers found it necessary to go into the market. Operations still much restricted, and shipments of straight mine-run are becoming common. Steam market continues weak.

The worst weather of the winter last week, with several days of snow and low temperatures, helped the retailers in this section, enabling them to unload much of their excessive stocks. As has been the case all through the winter, however, the cold weather did not last, and present indications are not favorable for marketing coal.

As practically all of the retailers were heavily stocked up, little, if any, business accrued to the operators as the result of the severe weather. A number of mines, in order to give their men work for a few days a week, have resorted to the expedient of shipping straight mine-run coal to their agents and customers. This grade is never in good demand here, however, as few large consumers can use it; and for sale to domestic consumers the same difficulties apply as now face the retailers.

The steam market, for some reason, continues to show a weakness which is difficult to explain. There is very little nut and slack being sold, apparently, and rather ample quantities offered, although the small production of the prepared grades would indicate rather a scarcity of screenings than an oversupply. Pea and slack from the western Kentucky field is a drug on the market at 15c, while nut and slack, at 50c. to the trade and 60c. to consumers, f.o.b. mines, is equally slow. For high-grade eastern Kentucky screenings 75c. is asked, while operators are glad to get that amount for straight run-of-mine. There could hardly be said to be a market for domestic coal.

SOUTHERN AND MIDDLE-WESTERN

BIRMINGHAM

Domestic coal shows little improvement. Steam coal slightly better than last week. Blacksmith normal. Furnace and foundry coke quiet. Pig-iron sales large. Car supply sufficient.

There is really little to say in regard to the steam-coal market, other than several large contracts are coming up soon, which has slightly stimulated the market. The demand is not sufficient to keep all mines working regularly. Domestic coal, after a slight flurry caused by a cold snap, has again fallen back into the old "rut," and the demand is not brisk, with prices below the scale prices for this period. Little improvement is expected in lump until the spring buying sets in, as all dealers are buying just enough to keep them going. Blacksmith coal is in a satisfactory condition, the demand being about normal, with prices stationery. Furnace and foundry coke are quiet. Furnaces report a large sale of iron, with prices nearing the \$11 mark for No. 2 foundry, f.o.b. Birmingham. The car supply is sufficient for the present business.

NEW ORLEANS

Price cut of \$2 a ton fails to stimulate business materially. New company making contracts at lower rate for bunker coal. Honduran R.R. buys. Coke demand strengthened.

In efforts to move their heavy stocks of coal several large dealers have cut prices as much as \$2 a ton. The reduction, together with colder weather last week, stimulated business to some extent, but it cannot be said that the cut resulted in any material movement of stocks.

The Alabama-New Orleans Transportation Co., which operates a barge line to the Alabama coal fields, has begun making contracts for bunker coal. Contracts signed last week made prices 50c. under those for Pittsburg coal and 25c. under Alabama coal brought by rail.

A cargo of coal moved last week from this port to Ceiba, Honduras. It is for the use on the railroad, which the United Fruit Co. is constructing at that point. This cargo was composed entirely of the Pennsylvania product. A cargo of Alabama coal will move next week to the same port from Mobile.

INDIANAPOLIS

Winter weather causes a spurt in retail domestic trade. Good steam demand, due weather and industrial conditions and fear of labor trouble. General range of prices unchanged but operators getting top figures. Mines on full time. Car situation quite satisfactory.

With the continuance of the cold snap the retail coal trade through Indiana was excellent and stocks in the yards were well cleaned up. While some operators and wholesalers claimed they were not getting much benefit, the majority say retailers and other buyers are coming in much better with orders. The mines are certainly in much better position than they have been for several months and are practically on full running schedule. Indiana block, however, does not seem to be thriving as well relatively as the other kind. That may be due to its higher price.

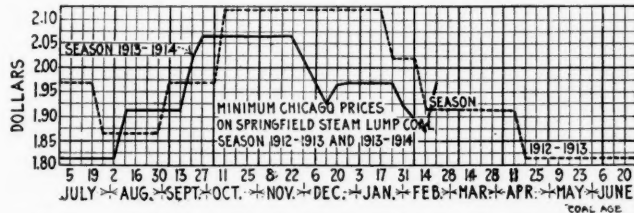
The mine-run basis and check-off disputes between operators and miners is not viewed with equanimity and the big consumers of steam grades are piling up reserves and taking no risks. Prices have not changed specifically, but the range has narrowed and most sales of screenings, steam grades and domestic are at or near the top of the range. The ill effects of the snow storms this month have been largely overcome by the railroads and the car service to the coal industry is better than it was. Probably for the first time on record, retail coal prices in this city have gone through the fall and winter without change. The following schedule was put in force Sept. 20 last, and is still effective:

Anthracite, chestnut.....	\$8.50	Hocking Valley lump.....	\$4.75
Anthracite, stove and egg.....	8.25	Lubrig lump.....	4.75
Anthracite, grate.....	8.00	Lubrig washed egg.....	5.00
Pocahontas, forked lump.....	6.50	Cannel.....	6.50
Pocahontas, shoveled lump.....	6.00	Linton No. 4 lump.....	3.50
Pocahontas, mine run.....	5.00	Linton No. 4 egg.....	3.50
Pocahontas, nut and slack.....	3.50	Indiana washed egg.....	3.75
Blossburg.....	5.50	Brazil block.....	4.25
Jackson (Ohio).....	5.50	Indianapolis lump coke.....	6.50
Kanawha lump.....	4.75	Indianapolis crushed coke.....	6.50
Kanawha, egg and nut.....	4.75	Connellsville lump.....	7.00
Pittsburgh lump.....	4.75	Citizens egg coke.....	6.50
Raymond lump.....	4.75	Citizens nut coke.....	6.50
Winifred lump.....	4.75		

CHICAGO

Cold weather has resulted in a revival in practically all lines. A considerable amount of coal is being purchased for storage purpose as it is expected there will be a cessation of mining in April. The market for byproduct coke has improved.

Continuation of cold weather has had a stimulating influence upon the Chicago coal market. Retail dealers report heavier sales and there has been a considerable amount of buying for storage purposes in anticipation of a cessation of mining next April, when the existing agreement between the operators and miners expires.



The accumulation of smokeless coal has disappeared and heavy demands from apartment houses have resulted in a revival of trade in this branch of the fuel business. The circular price of \$1.40 on mine-run coal is the prevailing figure. An increased demand for lump, egg and nut also has been noted. On West Virginia splint and gas-coal prices have been variable. The lump coal is held nominally at \$1.50. Prices for Franklin County coal are firmer; Standard prepared coal range between \$1.40 and \$1.60. The Cartersville market remains steady. Cold weather has brought an improvement in the market for byproduct coke. There also has been a heavier demand for gas-house coke.

Prevailing prices in Chicago are:

	Springfield	Franklin Co.	Clinton	W.Va.
Domestic lump.....	\$2.07@2.17	\$2.55@2.65	\$2.12@2.27	
Steam lump.....	1.97		1.97	
Egg.....		2.55@2.65		\$3.70
Mine-run.....	1.87	2.20@2.25	1.87	3.30
Screenings.....	1.47@1.52	1.80@1.90	1.47@1.52	

Coke—Connellsville, \$5.25@5.50; Wise County, \$5@5.25; byproduct, egg and stove, \$4.90; byproduct, nut, \$4.75; gas house, \$4.50.

KANSAS CITY

Warmer weather has caused the trade to again ease off. However, stocks are reduced and outlook brighter.

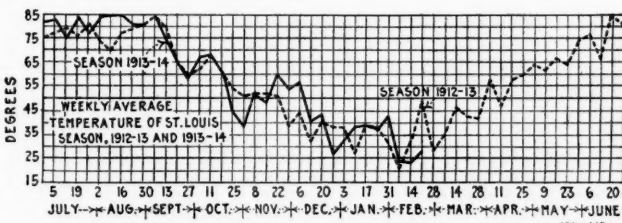
Moderation in the weather in the Southwest has caused a slackening in operations at the mines, after brisk business and full-time operations for two weeks past. The weather failed to show staying power enough to enable operators to keep their plants working to capacity. However, the fortnight of good business was welcome in all quarters and has had the effect of at least brightening up retailers. The latter reduced their stocks to a low stage during the favorable weather, and in many cases were forced to call on the mines for additional supplies. The dealers, however, have not bought heavily because of the season of the year.

ST. LOUIS

Winter weather creates some demand. Prices showing a raising tendency.

Some winter weather during the last week or ten days has caused a fairly good demand in a domestic way and with the beginning of this week the market assumed a different tone. Prices commenced to go up, and indications are that the latter part of the week will see some good prices.

The unusual demand for screenings has sent Cartersville up to about 85c. as the minimum, and Standard to about 65 or 70c., with every indication of both grades going from 15 to 50c. higher almost any day.



A few hundred cars of mine-run were sold during the past week as low as 95c. at the mines. Saturday, however, mine-run was hard to get at less than \$1, and during the present week the market has shown a tendency to stiffen. An unlooked for car shortage in the Cartersville field occurred dur-

ing the past few days, and this will likely continue. Large purchases of mine-run, together with extraordinary poor movement, has tied up equipment all over the Middle West.

There is practically no movement of anthracite, smokeless, or coke, and such as had been ordered is coming in slow.

The market is now quotable as follows:

	Cartersville and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump.....				\$1.05 @ 1.10	\$1.15
3-in. lump.....			\$1.40		
6-in. lump.....	\$1.25 @ 1.50		1.50	1.25 @ 1.35	1.25
Lump and egg.....	1.85 @ 2.15	2.15			1.15
No. 1 nut.....	1.20 @ 1.40				
Screenings.....	0.80 @ 0.85			0.55 @ 0.60	0.60 @ 0.65
Mine-run.....	1.10 @ 1.20				
No. 1 washed nut.....	1.50 @ 1.60	2.25	1.50		
No. 2 washed nut.....	1.25 @ 1.35		1.25		
No. 3 washed nut.....	1.25 @ 1.30				
No. 4 washed nut.....	1.25 @ 1.30				
No. 5 washed nut.....	0.75 @ 0.80				

OGDEN

Demand for lump quite brisk. Surplus of nut coal still continues at mines. Market for steam and slack very weak. Quotations for lump strong with nut offered at prices below circular.

The demand for lump coal still continues brisk with most of the mines somewhat behind in their shipments. This demand is caused by the continued colder weather and to the fact that most of the larger dealers have been able to reduce the amount of storage coal, most of which was put in during the fall and carried throughout the winter as a protection against a shortage. The dealer always plans to dispose of this during January and February and when a mild season is experienced the operator suffers during the time this is being moved.

A dozen bids were received at the office of the United States Engineers in the Couch Building to furnish the government with 5000 tons of coal for the work on the Celilo canal. Owing to the large amount of figuring to be done the contract will not be let for some time.

The bidders were as follows: American Fuel Co., lump, \$1.71; Wyoming Coal Co., Rock Springs, \$1.88; Roslyn Fuel Co., Roslyn coal, \$2.60. Utah Coal Sales Agency, Hiawatha coal, \$1.68; Kemmerer Coal Co., mine-run coal, \$1.83, lump coal, \$2.55; East Side Fuel Co., Rock Springs coal, \$1.90; Gunn Quealy Coal Co., Rock Springs lump, \$2.52; mine-run, \$1.79; A. L. Phelan, Roslyn Cascades coal, \$2.50; South Prairie coal, \$3.25, and George W. Sanborn, Rock Springs coal, \$2.59.

Quotations are as follows:

	California	Nebraska	General
Lump.....	\$3.00	\$2.75	\$2.75
Nut.....	2.50	2.00	2.25
Mine-run.....	1.85	1.75	1.85
Slack.....	1.00	0.75	1.00

PRODUCTION AND TRANSPORTATION STATISTICS

NORFOLK & WESTERN RY.

Following is a comparative statement of the N. & W. tonnage for January, 1913 and 14:

Field	Shipped		Tipple		Total	
	1914	1913	1914	1913	1914	1913
Pocahontas.....	970,550	1,262,869	18,313	18,579	988,863	1,281,448
Tug River.....	228,870	191,896	2,972	4,021	233,842	195,917
Thacker.....	251,703	277,018	9,445	6,944	261,148	283,962
Kenova.....	73,065	78,371	8,415	5,620	81,480	83,991
Totals...	1,524,188	1,810,154	39,145	35,164	1,563,333	1,845,518

Shipments of coke, entirely from the Pocahontas field, were 76,762 tons in January of this year as compared with 117,305 last year.

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for December and the six months ending Dec. 31, 1912 and 13, in short tons:

Destination	December		1913	Six Months %	1912	
	1913	1912			1912	%
Tidewater.....	301,113	223,833	1,614,503	17	1,690,591	20
East.....	224,684	251,819	1,254,609	14	1,215,205	15
West.....	849,714	724,867	5,681,077	62	4,947,470	61
Total.....	1,375,511	1,200,519	8,550,189		7,853,266	
From Connections						
Bituminous.....	62,856	65,984	624,276	7	241,671	3
Anthracite.....	681	1,541	8,370		6,971	1
Total.....	1,439,048	1,268,044	9,182,835	100	8,101,908	100
Coke.....	33,079	23,544	180,997		134,936	

Financial Department

Pacific Coast Co.

Earnings, income and expenses of this company for the fiscal year ending June 30, 1913, were as follows:

INCOME ACCOUNT—ALL COMPANIES				
	1912-13	1911-12	1910-11	1909-10
Gross earnings.....	\$7,945,931	\$7,496,912	\$7,798,739	\$7,903,148
Operating exp. and taxes.....	6,763,819	6,410,401	6,469,759	6,390,669
Net earnings.....	\$1,182,112	\$1,086,511	\$1,328,980	\$1,512,479
Other income.....	43,148	28,579	34,698	21,808
Total net income.....	\$1,225,260	\$1,115,090	\$1,363,678	\$1,534,287
Deduct—				
Interest on bonds.....	\$250,000	\$250,000	\$250,000	\$250,000
Pacific Coast Coal Co. loss			a55,610	
Improvements written off	5,734			1,176
Loss on steamships.....	72,088	68,284	39,181	67,000
Reserves.....			125,000	125,000
Depr., etc., of coal mines	24,935	20,550	24,464	25,402
Reduc. bk. val. S.T. lands	50,000			
Miscellaneous.....	19,484	14,596	391	21,626
Div. on first pref. (5%).....	76,250	76,250	76,250	76,250
Div. on 2d pref. (5%).....	(6%) 240,000	(6%) 240,000	(7%) 280,000	(7%) 310,000
Div. on common.....	(6%) 420,000	(6%) 420,000	(7%) 490,000	(7%) 542,500
Total.....	\$1,158,491	\$1,089,680	\$1,340,896	\$1,418,954
Balance, surplus.....	66,769	25,410	22,782	115,333

a Consists of Pacific Coast Coal Co.'s loss by explosion, Lawson Mine, \$165,410, less its reserve for replacements, \$110,000.

EARNINGS FOR YEARS ENDING JUNE 30

Department—	1912-13		1911-12	
	Gross Earns.	Net Earns.	Gross Earns.	Net Earns.
Pacific Coast SS. Co.....	\$4,195,644	\$184,634	\$4,181,147	\$143,389
Pacific Coast Ry. Co.....	226,491	43,222	247,720	59,764
Col. & P. Sd. RR. Co.....	595,324	183,227	514,035	149,737
Coal department.....	2,583,339	622,273	2,185,440	548,374
Lumber and miscellaneous	345,133	243,228	368,570	265,219
Taxes and general.....		deb94,473		deb79,972
Total.....	\$7,945,931	\$1,182,111	\$7,496,912	\$1,086,511

CONDENSED BALANCE SHEET JUNE 30—ALL COMPANIES

Assets—	1913		
	1913	1912	1911
Property (including stocks and bonds of proprietary companies)	\$20,336,433	\$19,797,823	\$19,712,391
Cash.....	665,357	1,062,843	962,270
Bills receivable.....		29,625	
Agents, conductors, etc.....	78,459	98,850	82,240
Companies and individuals.....	443,147	393,776	944,608
Land notes and contracts.....	168,272	155,826	193,647
Coal and lumber inventories.....	342,098	299,681	469,434
Prepaid accounts.....	a159,451	124,644	379,481
Claims against underwriters.....	56,204	200,288	148,890
Miscellaneous accounts.....	133,982	126,246	113,673
Materials and supplies.....	284,071	266,708	279,320
Total assets.....	\$22,667,474	\$22,556,310	\$23,285,954
Liabilities—			
Stock.....	\$12,525,000	\$12,525,000	\$12,525,000
First mortgage bonds.....	5,000,000	5,000,000	5,000,000
Vouchers and accounts.....	271,089	245,106	813,947
Wages and salaries.....	183,751	147,652	161,795
Dividend Aug. 1.....	184,063	184,063	184,063
Accrued interest on bonds.....	20,833	20,833	20,833
Taxes accrued.....	38,813	37,824	38,158
"Exhaustion fund" for coal lands.....	116,052	168,358	171,127
Special reserve fund.....	125,000	125,000	125,000
Other reserves.....	c260,411	220,441	412,187
Collections for traffic not yet earned.	70,766	65,047	91,999
Globe Navigation Co.....	187,500	250,000	312,500
Employees' hospital fund.....	31,424	29,818	32,187
Traffic balances and miscellaneous..	214,762	165,927	51,327
Profit and loss.....	3,438,010	3,371,241	3,345,831
Total liabilities.....	\$22,667,474	\$22,556,310	\$23,285,954

a "Prepaid accounts" include 1913 insurance paid in advance, \$138,467; taxes, \$14,509, and rentals, \$6475.
c "Other reserves" include in 1913 reserve for pilotage, \$63,431, and reserve for improvements, replacements and inventories, \$196,296.

Northern Securities Co.

President Jas. J. Hill reports for the year 1913, in part, as follows:

The investments have not been changed during the year. The regular dividends of 8% per annum have been received from the Chicago, Burlington & Quincy R.R.

No dividends have been received upon our holding of stock in the Crow's Nest Pass Coal Co. We are informed by the officers of that company that its operations during the past year have been satisfactory, but that it has been considered best to apply its net earnings to reduction of floating debt.

Our net income has been slightly larger than for 1912. The Net income for 1913 will, however, be chargeable with the 1% income tax of the U. S. Government. This tax will be payable in 1914 and will appear in the accounts for that year. The directors have declared a dividend of 2%.

RESULTS

	1913	1912	1911	1910
Divs. from C. B. & Q. RR. (reg. 8%).....	\$119,704	\$119,704	\$119,704	\$119,704
Divs. Crow's Nest Pass Co. (1%).....			27,552	55,104
Interest.....		34	40	40
Total receipts.....	\$119,704	\$119,738	\$147,296	\$174,848
Deduct— Taxes.....	3,477	3,477	3,679	3,512
Administration expenses.....	12,909	15,521	20,609	20,952
Interest on loans.....	4,918	5,615	5,438	5,427
Dividends.....	(2%) 79,068	(2) 79,068	(3) 118,590	(4) 158,116
Total deductions.....	\$100,373	\$103,681	\$148,316	\$188,007
Balance.....	sur. 19,331	sur. 16,057	def. 1,020	def. 13,159

BALANCE SHEET DEC. 31

Credits—		Debits			
	1913	1912		1913	1912
Organization exp	\$85,048	\$85,048	Capital stock	\$3,954,000	\$3,954,000
Investments....	a6,599,954	a6,599,954	Div. unclaimed.....	5	
Cash.....	60,922	61,585	Bills payable....	140,000	160,000
			Surplus.....	b2,651,919	2,632,587
Total.....	\$6,745,924	\$6,746,587	Total.....	\$6,745,924	\$6,746,587

a The item of investments includes in 1913 14,963 shares Chicago Burlington & Quincy R.R., valued at \$2,858,788; 27,552 shares Crow's Nest Pass Coal Co., Ltd., \$3,741,166.

b Before deducting 2% dividend paid Jan. 10, 1914.

COAL SECURITIES

William J. Hoey reports the market on various coal securities for the week ending Feb. 21, as follows:

Stock	Bid	Asked	Stock	Bid	Asked
American Coal.....	80	95	Jef. & Cle'd. C. & I. Pfd....	75	85
American Coal Products.....	83	84	Kentucky Block Cannel....	40	60
Amer. Coal Prod. Pfd.....	104	106	Lehigh Valley Coal Sales....	185	195
Big Muddy Coal & Iron.....	75	100	Leh. & Wilkes-Bar. C. Co....	300	350
Burns Bros.....	50	53	Mahoning Coal R. R.....	700	750
Burns Bros. Pfd.....	94	99	Mahoning Investment.....	73	78
By-Products Coke.....	112	116	Maryland Coal of Md.....	3	6
Central Coal & Coke.....	80	86	Maryland Coal of W. Va....	7	9
Central Coal & Coke Pfd....	78	86	Maryland Coal of W. Va. (5% Bonds).....	54	62
Chicago Lumber & Coal.....	50	56	Midland Coal.....	80	90
Chicago Wil. & Ver. Coal....	25	32	N. Y. S. & W. C. Pfd.....	15	30
Colo. Fuel & Iron Pfd.....	140	160	Pocahontas Con. Collieries..	92	101
Cumberland Corporation....	10	14	Pocahontas Con. Coll. Pfd..	98	105
Cumberland Corp. Pfd.....	40	43	Texas & Pacific Coal.....	97	101
Del. Lack. & West. Coal....	260	270	Unite Coal of Pittsburgh....	3	9
Elkhorn Fuel.....	4	10	Victoria Coal & Coke Pfd....	40	80
Elkhorn Fuel Pfd.....	55	70			
Hocking Valley Products... 1	4				
Bonds	Bid	Asked	Bonds	Bid	Asked
By-Prod. Coke, 6's, 1930... 100	102		New Riv. (Coal) 1st, 5's, 1951	96	99
Carnegie Coal, 5's, 1917.... 98	101		Pleas. Val. C., 1st, 5's, 1934..	75	83
Consol. Coal, Conv., 6's, 1923	100	102	Pocah. Collieries, 5's, 1937..	88	92
Consol. Coal, Ref. 5's, 1950.. 88	91		Pocah. Con. Coll., 5's, 1957..	94	99
Cumberland Corp., 6's, 1915.. 97	99		Solvay Collieries, 5's, 1931..	85	87
Erie-Pa. C. Col. Trust, 4's, 1951.....	90	91	Sunday Creek Co., 5's, 1944..	96	99
Fairmont Coal, 5's, 1931.....	93	96	Vic. Am. F. 1st, 5's, 1944....	58	64
Lack. Coal & Lum., 6's, 1961.. 57	59		Ref. S. F., 6's, 1940.....	90	100
Monongia. Riv. C., 5's, 1945.. 92	95		Vic. Fuel 1st S. F., 5's, 1953..	75	90
N.Mex. Ry. & Coal, 5's, 1947.. 96	99		Webster C. & C. 1st, 5's, 1942	79	84

DIVIDENDS

Delaware & Hudson Co.—Dividend of 2 1/4% payable Mar. 20 to holders of record, Feb. 29.

Reading Co.—Regularly quarterly of 1% on the second preferred payable Apr. 9 to holders of record Mar. 24.

Nova Scotia Steel & Coal Co.—Regularly quarterly of 1 1/2% on the common payable Apr. 15 to holders of record Mar. 31.

Despite the somewhat unsatisfactory state of the anthracite coal market during a considerable part of 1913, the gross revenue of the Lehigh Coal & Navigation Co., amounting to \$15,294,687 was the largest ever earned by that company.

It was a very dull week in the securities markets due partly to the Mexican situation and the unsettled question of freight rate increase. It was the dulltest week since the middle of December last.

One of New York's oldest banking houses is forming a syndicate to underwrite \$2,000,000 preferred stock of the King-Pocahontas Coal Co. which company has been incorporated under the laws of West Virginia.